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Septic Sore Throat and Scarlet Fever
SCAMMAN

Tabulation of Maternal Deaths
HEMENWAY

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The Hemolytic Streptococci and Antistreptococcus Serum in Scarlet Fever*

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THE relationship of the hemolytic streptococci to scarlet fever forms the basis upon which rests the serum therapy of the disease. Although the important work of Dochez and the Dicks started from the premise that a particular group of streptococci was the specific incitant of scarlet fever, previous experience with the identification of species in general and the streptococcus in particular, especially when based upon the variations in the agglutination reaction as it was in the beginning, suggested the possibility that the premise might be false, despite the fact that the results of their work had such unquestionable practical value in the treatment and prevention of the disease. The basis for the differentiation of a specific incitant of the disease seemed quite inadequate and untrustworthy. A thorough study was therefore made of the streptococci isolated from many different related and totally unrelated infectious processes. At the time this work was started the only method available for studying the toxin and antitoxin was the intracutaneous test on the human subject. This appeared to be an insurmountable obstacle to a very extended study until the goat was found to be a satisfactory substitute.

Since the reports published in 1926 on the study of the toxins of approximately 100 strains of streptococci from infections diagnosed as scarlet fever, and 100 strains from other infections, about 90 ad-

* Read before the Laboratory Section of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 1, 1929.

ditional strains from each of these sources have been tested with very similar results. It has been found that over 85 per cent of approximately 200 strains of streptococci from cases of scarlet fever, and about 70 per cent of 200 strains of streptococci from other infections produced toxins which induced definite skin reactions in goats. Approximately 65 per cent of all these toxins, irrespective of whether the source of the strain was a scarlet or non-scarlet infection, were neutralized by a standard antitoxic goat serum produced against the Dochez N. Y. 5 strain, while 35 per cent were not.

It is evident that even if by any chance there is a particular streptococcus which is the specific incitant of scarlet fever it is impossible to differentiate it by any of the known tests.

In a paper presented before the New York Division of the Society of American Bacteriologists in November, 1925, which unfortunately was not published, I suggested that it might

> . . . perhaps border on the quixotic to question the necessity of differentiating a particular streptococcus as the incitant of scarlet fever in order to fulfil Koch's postulates. The attempts to distinguish the scarlet streptococci from other forms have led to important discoveries, but they are largely based upon the agglutination and the absorption-of-agglutinins tests which have not been found to be altogether reliable in the separation of the strains of bacterial species, less so possibly with the streptococci than with any other species . . . possibly the importance or necessity of differentiating the streptococcus into the scarlet and non-scarlet strains has been greatly overemphasized in some of the work. If the etiological relationship of the streptococcus can be said to be reasonably established—and it appears to be—is it necessary to differentiate a particular streptococcus as the incitant? Do we really know enough about toxin production in general among bacterial species, or the action of any of the bacterial toxins in the tissues, to reach a final conclusion? In my own experimental work there are a number of observations, some published, others awaiting further analysis, which differentiate the toxin production of the pneumococci and the streptococci from their parasitic adaptation in infection quite similarly if not quite so clearly as we now recognize it in scarlet fever. Moreover, observations are accumulating in my own experience to indicate that special conditions of tissue susceptibility underlie the manifestations of toxic action.
>
> Experiments on the experimental induction of pneumonia in the partially immunized rabbit early emphasized the importance of tissue susceptibility. The most striking illustration, however, was observed in some unpublished experimental work which for ten years or more has been awaiting further experimental analysis:
>
> Rabbits inoculated with the pneumococcus usually die promptly with a bacteremia without any macroscopic or microscopic change in the tissues and organs of the body beyond those of congestion. Occasionally there are signs of hemorrhagic extravasation, but this is rather exceptional. When the streptococcus possesses a sufficient degree of adaptation or virulence, the results are similar, but if the virulence is extremely exalted the occurrence of hemorrhagic reaction is per-

haps more common. Under certain conditions of susceptibility, at present possibly quite indeterminate, the reaction may be quite a different one. In rabbits inoculated intravenously with a culture of highly virulent pneumococci directly from the heart blood of a dead animal, and 2 to 4 hours later treated with antipneumococcus serum, the animals, with varying febrile reaction, which appear normal in their cages may suddenly, in a few seconds, die in typical anaphylactic shock. In one experiment with 4 such animals inoculated at 12 o'clock noon, all 4 died in this manner between 10 and 10:20 p.m. In a larger series, the animals died irregularly at different periods up to 30 or 36 hours. At autopsy the hemorrhagic condition was extreme in the various organs and tissues. The lymph nodes and the tracheal mucous membrane were almost black.

The development of endocarditis during immunization of horses for therapeutic serum affords striking evidence of the selective action of the toxin on the blood vessels, and possibly suggests a relation to some phase of the development of immunity.

I recall also a case in private practice of nephrolithiasis and purpura hemorrhagica associated with streptococcus infection. The patient was sent to me by a surgeon for diagnosis, having travelled for ten years to various health resorts abroad on account of her condition. The urine was heavily laden with pus, but there were no other symptoms, and no febrile reaction. A full description of this case appears in the *Journal of the American Medical Association*, 1918.[5] The purpura hemorrhagica in this case was one of the most marked examples I have seen—injury so slight as to be unnoted, giving rise to extensive purpura. Streptococci were isolated and demonstrated filling the pus cells. There was no cystitis, the focus being in the kidney, associated with a large calculus. Vaccines were prepared from the streptococcus culture in human blood broth by centrifugalization, filtration of the culture fluid, and suspension of the sediment heated to kill the cocci. The vaccine of killed cells when injected caused no unusual reaction. The culture filtrate, however, gave rise to extensive hemorrhagic reaction, resembling the purpura, which diminished steadily with each injection, and after complete immunization the patient has been free from the purpura.

This appears to me striking evidence of the selective action of the streptococcus toxin and suggests special conditions of susceptibility underlying the action of these toxins.

More recently this point of view has aroused considerable interest and stimulated experimental studies in this country and abroad; for example, those of Stevens with Dochez and others.[6–10] The studies of the action of toxin and its neutralization by antitoxins in different animals by Miss Kirkbride and Miss Wheeler have brought out many observations which are of practical significance in considering the development of scarlet fever, because they relate so definitely to the variation in the action of toxin according to the different phases of tissue susceptibility. In many respects the toxins of the streptococcus obtained from different sources proved similar when their toxicity was tested in different animals and when this toxic action was neutralized by a standard serum. The similarity was so general when a strain

with a broad antigenic value was used as to make it difficult or impossible to differentiate these streptococci from different sources into specific or special groups; yet with closer study some very marked differences were noted, even in the toxins which were apparently so similar. For example, toxins when tested in one individual apparently had a similar action varying only in degree, but when tested on another individual or on different animals, one was toxic and the other without action. In other words, there are phases of tissue susceptibility essential to the action of the toxin which may be present in one individual and not in another. This is an important fact when one considers the development of scarlet fever, and presents also certain difficulties in testing tissue susceptibility by the intracutaneous test with one toxin, and stresses the importance of selecting a standard toxin of sufficiently broad action to give results of practical value. Moreover, the toxins are apparently complex; one may be completely neutralized by an antitoxin whereas another may be only partially neutralized by this antitoxin, and it appears that these differences in reaction are due to different activities of the toxin, because the activity which is not neutralized by one antitoxin is neutralized by another produced by a different strain or possibly in a different animal. Toxins which are apparently similar when neutralized by one antitoxin are thus shown to be quite dissimilar when tested with another produced by different strains of the streptococcus or by the same strain in a different animal, and also when tested in different animals or in different persons. The results of this work thus have a very important bearing on the specific etiology of scarlet fever and suggest the conditions underlying the development of the disease—possibly explain the reason why scarlet fever often fails to develop after exposure when expected, or appears when least expected.

The preparation of different antitoxins afforded an excellent opportunity for the comparison of the different strains as antigens. The valency of the antitoxins prepared with some strains was much more limited than that of antitoxins prepared from other strains. Moreover, the potency varied. The selection of a standard strain for the purpose of comparison or for the preparation of therapeutic serums, therefore, is extremely important. The Dochez N. Y. 5 strain has proved without exception the most satisfactory strain from the standpoint of polyvalency and antigenic potency. Strains were found which produced a stronger toxin but these failed to produce serum of higher potency or as great polyvalency. The Dick strains I and II were not satisfactory. In no horses we have tested has it been possible to obtain a serum of sufficient potency for distribution. The

high potency and broad polyvalency of the serums produced by immunization of horses with the Dochez N. Y. 5 strain proved so much greater than that of any other serum that in the preparation of the therapeutic serum there appeared to be no necessity for the addition of other strains—rather the contrary.

Methods of immunization differ in that the Dicks have recommended immunization with the toxin, whereas Dochez has emphasized the importance of injecting subcutaneously living virulent cultures into a mass of agar. Immunization with the toxin alone has not in our experience produced a serum of sufficient potency for the treatment of the disease. It is necessary to inject living cultures to obtain the most potent serums.

Production of serums of the highest potency and polyvalency has been greatly handicapped by the difficulties of standardization, and also greatly complicated by the selection of different strains for immunization of the horses. With many of these strains standardization has only been practicable on human subjects. The serums for distribution have in a great majority of the instances been concentrated. Standardization is much more difficult when it has been concentrated. We have been particularly fortunate in having selected a single strain which has not only lent itself most satisfactorily to the immunization of horses but can be standardized on the goat as well as the human subject; hence it has been possible to follow the progress of the immunization of the horses closely, and bleed at opportune periods of immunization. Finally, the potency and polyvalency attained in this monovalent serum have been such as to render concentration quite unnecessary, and in fact a questionable procedure. Serums of the highest potency have scarcely been bettered by concentration.

The results of comparative tests which appeared in a recent publication of the *Journal of Hygiene*[11] very strikingly illustrate the points which I have brought out. In these tests the therapeutic serums from a number of laboratories were obtained and tested. With one exception these were all concentrated, and nearly all of them had a potency less than half that of our standard control serum. The standards for serums available for treatment have been advanced within the last two years, as a result of the distribution of a standard or control serum for purposes of comparison to the different producing laboratories, but the minimum federal standard of 200 units seems totally inadequate, and for some time it has been our practice to distribute no serums of less than 600 units, 30,000 skin-test doses, and the majority have approximated 800 units per c.c. The commercial

and other serums which are distributed under federal license are labeled as to potency, and the clinician can very readily estimate the potency of any serum by dividing the total units or skin-test doses by the number of cubic centimeters in the dose. In the literature the comparison of the dosage, when reported, in skin-test doses and also in cubic centimeters, indicates a rather low potency approximating the minimum federal standards.

The action of the serum in the treatment of the disease has been most carefully determined by Blake in his early work.[12-14] These studies point out very clearly the limitations in treatment. He was able to demonstrate the presence of toxin in the blood during the earliest stage of the disease and also the neutralization of that toxin by the administration of serum in the uncomplicated case. In the later stages of the disease and in cases complicated by extension of the infectious process the toxin was not so completely neutralized by the serum and the treatment was not so effective.

Reports on the clinical treatment of scarlet fever have now accumulated so there are large series of cases in the literature. The potency of the serums which were used is not clearly stated in many articles. One can only infer from the dosage when recorded, or from experience in testing representative samples of these serums, that the potency was very low or might even have been entirely lacking. We have found serum in which we could not detect any antitoxic activity although it was labeled to neutralize 30,000 skin-test doses per c.c.

There are different points of view regarding the practical value of serum therapy in scarlet fever. The disease is so much milder than formerly; there are so many cases which recover quickly and spontaneously without complications; and so many others of a serious character with complications which do not respond definitely to the serum treatment, that some clinicians question its practical value. The results, however, are so striking when cases are treated early that the great majority of clinicians strongly advocate its use.

Apparently many treat only the selected cases of more serious types. The seemingly mild onset in a few of the complicated and serious infections constitutes a real difficulty because it is impossible to determine this fact at the time that treatment should be given. If such favorable results were obtained with the early serums one would naturally expect the more potent serums to be even more efficacious. Certainly it is inconceivable that the early administration of serums of the highest potency should not be a very important factor in the prevention of the unforeseen development of complications, which is really the crux of the problem. Thus it is obviously

owing to the fact that the disease has become, in such a vast majority of cases, of a mild type, that the value of serum therapy is not brought out by comparative statistics. Delayed diagnosis and treatment also tend to make the conclusions from these statistics untrustworthy. One is forced to rely upon the study of the effect of serum in individual cases, particularly the complicated and fatal cases.

Reports have been received on the treatment of 587 cases of scarlet fever with our monovalent antistreptococcus serum, unconcentrated, which titers from 600 to 800 units per c.c., or 30,000 to 40,000 skin-test doses. The individual dose approximated 10 c.c. or 6,000 to 8,000 units. These cases have been treated under various conditions, and on account of incomplete data it is impossible to classify them into groups which could be considered as having received satisfactory treatment as contrasted with those which received unsatisfactory treatment. The cases have been grouped according to the type of the disease in Table I.

TABLE I

CLASSIFICATION OF CASES OF SCARLET FEVER TREATED WITH NEW YORK STATE UNCONCENTRATED ANTISTREPTOCOCCUS SERUM

	Total		Mild		Moderate		Severe	
	No.	%	No.	%	No.	%	No.	%
Cases treated	587		103	18	282	48	202	34
Fatal cases *	27	5	0	0	3	11	24	89
Recovered cases	560	95	103	18	279	50	178	32
Recovered cases in which complications were present	149	25	15	10	55	37	79	53
a. serum had definitely favorable action	92	62	10	11	34	37	48	52
b. apparently improved by serum but no change noted in complications	25	17	3	12	9	36	13	52
c. serum had no apparent effect	13	9	0	0	6	46	7	54
d. results of serum treatment inconclusive	19	13	2	10	6	31	11	58

* 18 cases with complications
9 cases without complications
1 very severely toxic
2 fulminating
6 serum administered within 24 hours antemortem (2 anaphylactic shock)

In practically all of the cases which recovered the effect of treatment is such as has been very generally described, fading of rash, fall in temperature and pulse rate, relief of symptoms due to toxic condition, and marked subjective signs, 12 to 48 hours after administration of serum. The proportion of complicated cases which recovered —149 of the total 587 cases—suggests that physicians had selected the severe type of case for serum treatment. Practically all of the

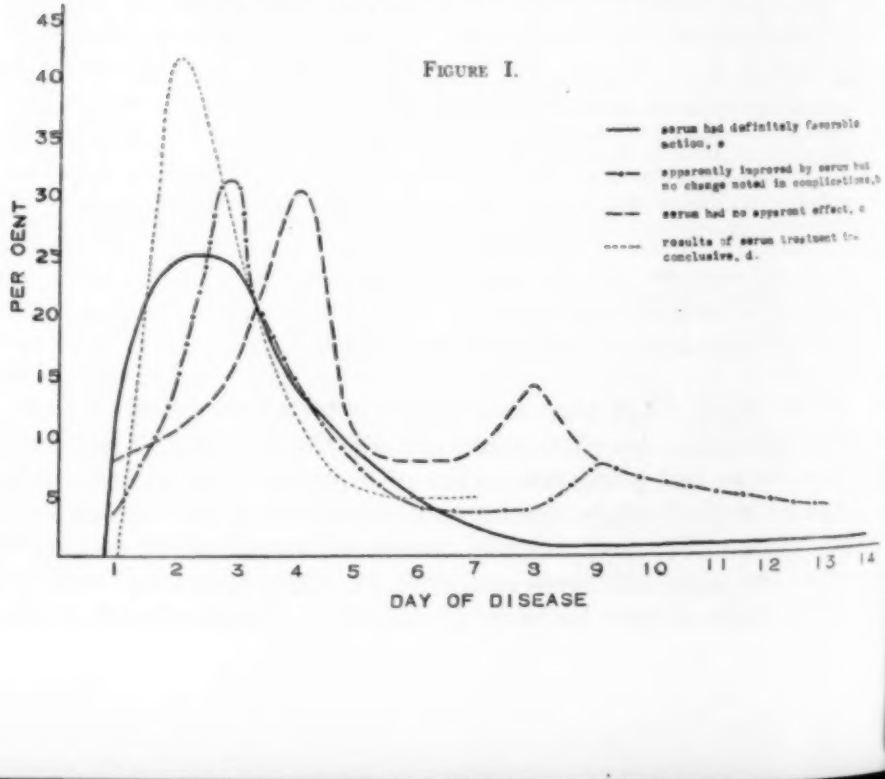
27 fatal cases were infections with complications, or were of the fulminating or malignant type, or were treated late in the disease, in some instances shortly before death. The fact that there were 176 complicated or fulminating cases out of 587, and the rather high mortality of 4.59 per cent are further indications of the severe type selected for treatment. However, that there were 149 cases with complications which recovered is of interest, especially as some of these cases were severe types and evidently had an extension of the infectious process so that they were not simple toxemias.

Of the 149 cases which had complications and recovered, 136 improved under serum treatment. There were no definite signs of improvement in the remaining 13. Of the 149 recoveries with complications, 34 had otitis media, 5 mastoiditis, 19 cervical adenitis, and 9 some gland involvement, 2 involvement of the salivary glands; 2 endocarditis, 4 arthritis, 6 rheumatic affection of the joints, 14 varying degrees of nephritis, 7 abscesses (neck, tonsils, submaxillary glands, etc.), 1 axillary cellulitis, and the remaining had minor extensions of the process.

There were 13 cases in which the serum had no apparent effect on the course of the disease. The character of the complications, the late stage at which treatment was started, or the inadequate dosage,

DAY OF DISEASE ON WHICH SERUM TREATMENT FIRST ADMINISTERED IN RECOVERED CASES WITH COMPLICATIONS

FIGURE I.



accounts for many but not all of these. There is always a varying but definite number of cases of all infectious disease which do not respond to serum treatment. The cases which did not respond to treatment, whether they recovered or died, are of such interest that their histories have been summarized.

SUMMARY OF THE RECOVERIES THAT APPARENTLY DID NOT RESPOND TO TREATMENT (13)

1. F., age 5. Onset, 2/20; rash, 2/23. Symptoms severe: acute conjunctivitis, nephritis, otitis media; measles. 2/28, 7,200 to 8,000 units serum intramuscularly; infection of eye 6 days after onset. No apparent results from serum.
2. F., age 43. Onset, 3/28; rash, 3/31. Symptoms moderate: discharging ears, cervical glands tender and swollen. 3/31, 24,000 units serum intravenously; 3,000 units diphtheria antitoxin on admission. Results of serum "none."
3. M., age 8. Onset, 12/24; rash, 12/25. Symptoms moderate: adenitis, arthritis, endocarditis. 12/30, 6,000 units serum intravenously. Patient recovered fully; had typical desquamation. Complications developed several days after administration. Serum had apparently no effect on general symptoms.
4. F., age 5. Onset, 4/2; rash, 4/3. Symptoms moderate: cervical adenitis. 4/5, T. 101°, 6,000 units serum. 4/6, T. 103°; 4/8 to 4/11, 102°; 4/12, 103° (earache). 4/14, T. normal.
5. F., age 7. Admitted to hospital, 4/26. Symptoms severe: bilateral mastoid (operated), double otitis media, arthritis, glands, infected finger. 4/26, T. 105°, 12,000 units serum intramuscularly. 4/27, T. 102° rising to 105° in p.m.; profuse nasal discharge; 12,000 units serum intravenously and 12,000 units diphtheria antitoxin. 4/28, T. 101°, 18,000 units serum intravenously. "No apparent effect from serum."
6. M., age 6. Onset, 7/19; rash, 7/20. Symptoms severe: swollen glands, abscess on neck and right forearm; patient cyanosed on admission; pulse imperceptible. 7/21, T. 105°, 6,000 units serum intramuscularly. 7/22, T. 101°. 7/23, T. 104°, 6,000 units serum intramuscularly. Results of serum, "none."
7. F., age 33. Onset, 12/13; rash, 12/15; hemolytic streptococci isolated. Symptoms moderate: sinusitis. 12/15, 12,000 units serum; 12/16, no improvement; 12/17, T. normal, rash fading; 12/19 to 12/26, persistent temperature.
8. F., age 2½. Onset, 2/9; rash, 2/10. Symptoms severe: otitis, glands. 2/16, 2/17, 2/18, 6,000 units serum each day. T. 102° to 104° during serum treatment. Results, "none."
9. F., age 8. Onset, 4/29; rash, 5/1. Symptoms severe: lobar pneumonia, double otitis media. 5/2, 6,000 units serum intramuscularly. "No apparent effect."
10. F., age 8. Onset, 4/16; rash, slight 4/17 and 4/18, definite 4/19. Symptoms moderate: lymphadenitis both sides neck. 4/19, 7,200 units serum. T. returned to normal on 6th day after administration of serum.
11. M., age 3. Onset, 2/21; rash, 2/26, lasting 6½ days. Symptoms moderate: otitis on 6th day. T. advanced from 101° to 104°. 2/28, 3,200 units serum.

3/1, 1,600 units serum intramuscularly. Discharge from ears for 1½ months.

12. F., age 6. Onset, 1/8; rash, 1/9; streptococci isolated from throat culture. Symptoms severe: nephritis, otitis media, mastoiditis, rheumatic syndrome, urticaria. 1/11, 6,000 units and 1/12, 600 units serum intramuscularly. Serum had apparently no effect.
13. F. Onset, 3/28 (operated for empyema on 3/28); rash, 3/30. Symptoms severe: empyema. 4/2, 6,000 units serum; serum rash, considerable pains; very toxic. Serum apparently had no effect.

SUMMARY OF THE FATAL CASES (27)

1. M., age 3. Onset, 2/5, "with sore throat and convulsions; T. 105.6° (rectal); angina marked on 3d day; comatose throughout illness; systolic murmur at apex of heart began 2/10, also middle ear at same time." 2/11, 5 p.m., 800 to 1,200 units serum subcutaneously; dose repeated at 11 p.m. with "no visible change." Death, 2/13.
2. M., age 25. Clinical diagnosis: scarlet fever or erysipelas. Previous history: patient admitted to hospital 10/4/24 with gun-shot wound; tetanus antitoxin (1,500 units) given at this time. 6/10/25, while wound was still discharging, left hospital to visit his children at orphanage; scarlet-like rash appeared; T. 104°; 0.2 c.c. antistreptococcus serum intracutaneously in each of 2 areas produced local blanching in 5 hours; 1,600 units then given intravenously and 3,200 intramuscularly—marked toxemia; condition not favorable. Following morning rash entirely disappeared, T. 100°; patient comfortable and improvement striking. Death several weeks later from septicemia.
3. F., age 42. Had nursed daughter who had developed scarlatinal rash and otitis media following tonsillectomy. Daughter's rash disappeared 24 hours after administration of 7,200 to 8,000 units of serum; other symptoms persisted but she finally recovered. Mother developed rash day or two after daughter, with marked angina of throat, also subacute arthritis becoming more acute. Serum produced local blanching of rash; 7,200 to 8,000 units given intramuscularly; rash disappeared in 24 hours, otherwise no change; 2 days later a subacute erysipelas became rapidly acute and fatal in about 48 hours.
4. M., age 19. Onset, 1/27; rash, 1/29. Symptoms severe: angina and marked toxemia. 1/31, 12,000 units serum intravenously, 6,000 intramuscularly; later that evening 18,000 units intravenously. T. dropped; patient seemed less delirious, but died 2/1.
5. M., age 2. Onset, 11/5; rash, 11/6. Symptoms severe. 11/10, less than 4,000 units serum. Death, 11/11.
6. F., age 23. Onset, 1/28; rash, 1/29. Symptoms severe. 2/2, 4,000 to 8,000 units serum intramuscularly. Death, 2/3.
7. M., age 2. Onset, 2/17; rash, 2/18. Symptoms severe: profuse nasal discharge. 2/22, 12,000 units diphtheria antitoxin and from 4,000 to 8,000 units antistreptococcus serum intramuscularly. Death, 2/26.
8. M., age 54. Onset, 1/8. Symptoms severe: oedema of larynx. 1/12, 6,000 units serum. Died following day.
9. F., age 4. Onset, 2/9; rash, 2/10. Symptoms moderate. T. 102°. 2/11, 6,000 units serum intramuscularly; patient much improved: T. normal, P. 96. 2/16, T. 103°, acute serum rash; cervical glands enlarged and tender; T. rose

to 104°—patient seemed very sick, serum rash increased. 2/20, patient more toxic, nauseated and vomited; considerable mucopurulent discharge in throat. Death, 2/23, probably from laryngeal edema.

10. M., age 3. Onset, 12/24; rash, 12/27. Symptoms severe: malignant type. 12/28, 4,000 to 8,000 units serum intramuscularly. Death, 12/30.
11. M., age 7. Onset, 7/1; rash, same day. Symptoms moderate. Approximately 6,000 units serum intramuscularly; child apprenhensive, struggled. Two minutes after administration of serum, child had convulsion; respiration ceased; death attributed to status lymphaticus.
12. M., age 7. Onset, 7/1; rash, 7/2. Symptoms severe: double otitis media and cervical adenitis. Became very toxic on 3d day. Serum (dosage not stated) given on 4th, 5th and 6th days. Condition greatly improved for about 1 week, when severe infection of cervical glands developed with erosion of jugular vein and large artery. Death on 21st day of disease from hemorrhage and sepsis.
13. M., age 7. Onset, 7/1 with profuse rash. Symptoms severe: cervical adenitis, fatal erosion of external jugular vein and lingual artery. Patient received 12,000 to 16,000 units of serum daily for 6 days beginning 3d day; general symptoms improved. Death, 2 weeks after onset.
14. F., age 39. Onset, 2/4 with rash. Symptoms moderately severe but with uncontrollable nausea and vomiting; complete suppression of urine for 36 hours. 2/6, T. 106°, 6,000 units serum; patient improved; rash faded. Death, 14th day of disease.
15. M., age 7. Onset, 2/9; rash, 2/10. Symptoms septic: marked throat conditions; first 2 days patient did not promise to be severe case but became more septic. 2/13, T. 103°, 6,000 units serum; 2/14, dose repeated; little or no improvement. Death, 2/15.
16. M., age 24. Onset, 3/7 with rash, T. 104°. Symptoms severe. (2/24, patient had operation for ruptured gangrenous appendix.) 3/8, T. 102°–103°. 3/9, 6,000 units serum intramuscularly; T. then 104°–105° and remained high; patient became delirious and died, 2/10.
17. M., age 5. Onset, 3/30 with rash. Symptoms moderate until 4/10 when they became severe: double otitis media, double mastoiditis, broncho-pneumonia, and acute nephritis. 4/11, 13th day of disease, 6,000 units serum subcutaneously; T. remained high; no improvement. Mastoid operation, 4/13. Death, 4/16.
18. M., age 26. Onset, 1/27; rash, 1/28. Symptoms severe. History of epilepsy. 1/20, 12,000 units serum intramuscularly; dose repeated in evening. T. dropped but patient was very toxic and comatose. 2/4, pneumonia of left lower lobe developed. Death, 2/6. Autopsy: broncho-pneumonia.
19. M., age 38. Onset, 6/6; rash, 6/7. Symptoms severe: T. 104°, hemorrhagic nephritis, uremia and septicemia. 6/10, 18,000 units antistreptococcus serum and 12,000 units diphtheria antitoxin; T. fall only temporary; uremic poisoning. Death, 6/17.
20. F., age 28. Onset, 5/6; admitted to hospital, 5/10. Symptoms moderate: T. 104°; 6,000 units serum subcutaneously. 5/11–13, T. 99°–101°; 6,000 units serum intramuscularly. 5/19, type III pneumonia developed; fatal 5/28.
21. M., age 3½. Onset, 8/7; rash, 8/9. 8/12, T. 103.6°; patient unconscious; rash all over the body; 6,000 units serum intramuscularly. Death same day.

22. F., age 6. Onset, 1/8; rash, 1/9. Symptoms severely toxic: T. 105°–106°. 1/10, 6,000 units serum intramuscularly; T. dropped temporarily. Following day streptococcus pneumonia developed, T. 104°, 6,000 units serum intramuscularly, T. dropped to 102° but rose again quickly. Death, 1/16.
23. M., age 8. Onset, 4/1; rash, 4/2. Symptoms severe. 4/3, 3,000 units serum. In 10 minutes patient irrational, cyanosed, and pulseless; adrenalin had no effect. Death 15 minutes after serum injection.
24. F., age 26. Onset, 3/9; rash, 3/10. Symptoms severe: patient toxic and delirious. 3/12, 12,000 units, 3/13, 12,000 units serum intramuscularly. T. dropped from 103° to 100° following day—patient brighter and mentally clear, pulse improved. 3/15, again toxic, stuporous. 3/16, T. 105°; 12,000 units serum intravenously. 3/17, T. 106°; 18,000 units serum intravenously; T. dropped to 101°, returned to 106° within next 4 days. Death, 3/21.
25. M., age 7. Onset, 2/8; rash, 2/10. Symptoms severe: vomiting and delirium, discharge of right ear. 2/13, 6,000 units antistreptococcus serum intramuscularly; dose repeated in the evening together with 18,000 units diphtheria antitoxin intravenously. 2/14, T. dropped from 105° to 101° but returned to 103°; 6,000 units serum and 12,000 units antitoxin intravenously. 2/19, serum rash. Death, 2/22.
26. F., age 12. Onset, 5/3; rash, 5/5. Diagnosis: scarlet fever and nasal diphtheria. Symptoms severe: vomiting; admitted to hospital in very serious condition, toxic and cyanotic. 5/8, 6,000 units antistreptococcus and 6,000 units diphtheria antitoxin intramuscularly; in the evening 12,000 units serum and 12,000 units antitoxin intravenously; half an hour later 18,000 units serum and 12,000 units antitoxin intraperitoneally. 5/9, 12,000 units serum and 12,000 units antitoxin intravenously; in the evening 6,000 units serum and 12,000 units antitoxin; pulse improved but temporarily. Death, 5/10.
27. M., age 32. Onset, 5/6; rash, 5/7. Symptoms severe: nephritis and cardiac condition. 3,000 units antistreptococcus serum; also diphtheria antitoxin. Died in 4 days.

These fatal cases were evidently severe infections with two exceptions, 15 and 17, which had a mild onset and became complicated—very striking illustrations of the impracticability of distinguishing early in the disease a mild form of scarlet fever that does not require serum treatment. Nine of these 27 cases can scarcely be said to have had sufficient serum. Three of these, 5, 6, and 8, not only received insufficient serum but received it late, less than 24 hours before death; and another, 10, 48 hours before death. Beside these, 3 cases (1, 15, and 17) were treated late. Three (2, 12, and 13) improved under serum treatment but died later. Four (7, 19, 25, and 26) apparently had diphtheria and 3 (18, 20 and 22) pneumonia. Two cases (11 and 23) died of anaphylactic shock, in one instance attributed to status lymphaticus.

Case 3 is interesting because both mother and daughter developed the disease and were treated with serum. The daughter recovered promptly; the mother died with acute erysipelas. The serum was evi-

dently effective in one instance and not in the other. Case 9 is especially interesting because it suggests the possibility of serum sickness acting as a predisposing condition, favoring the development or extension of complicating processes.

The results of serum therapy in our experience, as recorded in the tables, correspond in general with those published by other observers. The mortality or the recovery in complicated cases depends largely upon the severity of the disease in the cases which have been selected for treatment. The small proportion of mild cases is obviously an indication that the cases treated were severe infections. A considerable number, at least 3, of the fatal cases should be eliminated on account of the fact that the quantity of serum was inadequate and was given late in the disease, 24 hours or less before death. It has not been practicable to eliminate those in which the physician delayed treatment until the prognosis had become serious or definitely unfavorable, but there is a considerable number of such cases.

One of the objections to the serum treatment of all cases of scarlet fever is the occurrence of serum sickness. The quantities of serum are such as to give rise to well marked reactions a week or 10 days after treatment. In the series there are 3 cases of anaphylaxis; 2 of them are listed in the series of fatal cases (11 and 23), 1 was diagnosed as status lymphaticus, and the other did not respond to adrenalin and died within 10 minutes after serum treatment. The third case of anaphylaxis responded to adrenalin and recovered. No history of previous sensitization was obtained. The percentages of serum sickness reported in the literature vary greatly; 30 and even 40 per cent are recorded. Whether or not this is directly proportional to the quantity of protein injected is difficult to determine. The percentages of serum sickness were high in some instances where large quantities of serum were given, but the data are inadequate to indicate the relationship between the occurrence of serum sickness and the potency of the serum used. The concentrated product does not appear to lessen the number of reactions materially, for the concentrated serums have not been of sufficiently high potency so that the dosage, and therefore the quantity of protein, could not be reduced materially. In our experience, approximately 28 per cent developed serum sickness.

Statistics indicate quite definitely some protection as a result of vaccination or active immunization with the streptococcus toxin, but this has not been altogether reliable. As a result of experience, the dosage and the number of inoculations have been increased in the hope of securing more effective protection, all of which raises a ques-

tion as to its practical value as contrasted with close observation and prompt treatment of cases as soon as they develop. Although active immunization when adequate and applicable is effective, passive immunization with serum has not received much general support—rather the contrary. Our policy has been a conservative one. We have not recommended protective treatment, save in special instances, and have questioned the practical value of its general application.

The practical results of serum therapy in scarlet fever with antistreptococcus serum produced by a streptococcus isolated from a case of scarlet fever might lend support to the view that a particular streptococcus is the specific incitant of the disease were it not for the fact that this serum is also effective in other streptococcus infections. Erysipelas was also attributed to a specific organism, but subsequent work has shown that it is impossible to differentiate the streptococcus of erysipelas. Recently special antistreptococcus serums have been produced for the treatment of erysipelas. These serums were tested in comparison with a serum produced for the treatment of scarlet fever against toxins produced by strains isolated from cases of erysipelas. Our results indicate that the antistreptococcus serum produced by the Dochez N. Y. 5 strain has an equal or even greater potency and polyvalency, and the serum used in scarlet fever has also been used in cases of erysipelas as effectively as the special antistreptococcus serum for this disease.

CONCLUSIONS

There is no definite evidence that a particular group of streptococci are the specific incitants of scarlet fever—rather the contrary. Analysis of the morphological, biological, serological and immunological characters of approximately 400 strains of streptococci from different sources fails to distinguish any distinct groups of streptococci associated with the different infectious processes incited by these organisms. The toxic action of 85 per cent of 200 strains of streptococci from scarlet fever and 70 per cent of 200 strains from other sources was quite similar when tested in goats. Approximately 65 per cent of all these toxins, irrespective of whether the source of the strains was a scarlet or non-scarlet infection, were neutralized by control antitoxic serum produced by a single strain.

A study of the action of streptococcus toxin in different individuals and in different animals, and of its neutralization by different antitoxins, demonstrates that certain phases of tissue susceptibility are essential to the action of that toxin. Since tissue susceptibility is such an important factor, and since it is practically impossible to demonstrate a specific incitant of scarlet fever or other infectious processes attributed to the streptococcus, the necessity for assuming a specific incitant of the disease may be reasonably questioned.

Since the different streptococci vary greatly in their toxic and antigenic action, it is essential to select the most representative strain or strains for the immunization of horses, in order to obtain serums of the highest potency and broadest poly-

valency. The Dick strains I and II which have been used so generally have not proved satisfactory. Of all the strains tested to the present time the Dochez N. Y. 5 is the most representative and effective in the immunization of horses.

The method of immunizing horses either with toxin alone or with culture alone injected subcutaneously into agar has, in our experience, proved to be inadequate. The standards of potency and polyvalency of therapeutic serums for treatment should be advanced. (According to our experience a minimum standard of 400 to 500 units would be a practical one.) It has not been difficult to obtain a potency of 800 units per c.c. The practical value of concentrating serum has not been demonstrated.

Effective agents for the prevention and cure of scarlet fever are now available and their practical value is clearly defined as a result of recent experience. Vaccination by repeated doses of toxin is an effective measure, but the increasing number of injections and dosage required as a result of experience takes time, which is a practical difficulty. The duration of immunity has not yet been established. The prophylactic injection of serum has not received general support—rather the contrary—and as a practical measure has little, if any, advantage over the immediate treatment of cases as they develop, providing the persons exposed are kept under observation, which is an essential procedure in outbreaks, irrespective of preventive inoculation. Preventive measures in scarlet fever thus have an application practically limited to special outbreaks.

The therapeutic action of the serum in the cure of the disease is prompt and effective. The necessity of using it in mild cases has been questioned. In the very toxic, fulminating cases, and late in the disease after serious complications have developed, the action of the serum is not always apparent, or is evanescent, but it does no harm. Evidence is accumulating that some of the cases with complications respond to treatment and that the administration of the serum prevents the development of these complications. Thus it is of the utmost importance that serums of the highest potency and polyvalency be used in the treatment of this disease if definite information is to be gained from statistics.

The disease has become so mild or modified in type in recent years, and varies so greatly in different groups of cases; the mortality is so low and spontaneous recovery so prompt and frequent; the potency of the serums used in the treatment of cases so seldom recorded, and the types of cases selected for treatment are so variable; that it is impossible to compare statistical reports or to draw definite conclusions. There is no question, however, that prompt treatment with an adequate dosage of potent serum is not only effective in curing or shortening the course of the uncomplicated disease, but that it also prevents the development of complications in many cases treated.

This series of cases cannot be considered to have been treated under the most favorable conditions. It includes cases in all districts of the state, urban and rural, and is not limited to those treated in the best hospitals.

REFERENCES

1. Kirkbride, M. B., and Wheeler, M. W. Studies of the Toxins of the Hemolytic Streptococci Associated with Scarlet Fever, *J. Immunol.*, 11: 477, 1926.
2. Kirkbride, M. B., and Wheeler, M. W. Further Observations on the Toxins of Hemolytic Streptococci, *J. Immunol.*, 13: 19, 1927.
3. Kirkbride, M. B., Wheeler, M. W., and Hendry, J. L. A Study of the Reactions Between Toxins and Antisera Produced with Hemolytic Streptococci, *J. Immunol.*, 15: 539, 1928.
4. Wadsworth, A. B., Kirkbride, M. B., and Wheeler, M. W. Standardization of Scarlet Fever Antistreptococcus Serums, *J. A. M. A.*, 87: 623, 1926.

5. Wadsworth, A. B. Nephrolithiasis Purpura Hemorrhagica and Streptococci Infection, *J. A. M. A.*, 71: 2052, 1918.
6. Dochez, A. R., and Sherman, L. Some Reactions in Sensitized Guinea Pigs to the Filtrate of Scarlatinal Streptococcus, *Proc. Soc. Exper. Biol. & Med.*, 22: 282, 1925.
7. Dochez, A. R., and Stevens, F. A. Studies on the Biology of Streptococcus. VII. Allergic Reactions with Strains from Erysipelas, *J. Exper. Med.*, 46: 487, 1927.
8. Dochez, A. R., and Stevens, F. A. Relation of Allergy to Scarlet Fever, *New York State J. Med.*, 29: 22, 1929.
9. Zinsser, H., and Grinnel, F. B. Further Studies on Bacterial Allergy. Allergic Reactions to the Hemolytic Streptococci, *J. Immunol.*, 10: 725, 1925.
10. Meyer, S. Kritisches zu der Dickschen Scharlachlehre auf Grund klinischer Beobachtungen und experimenteller Ergebnisse, *Ztsch. f. Kinderh.*, 43: 285, 1927.
11. Wadsworth, A. B., Kirkbride, M. B., and Hendry, J. L. A Comparative Study of the Potency and Polyvalency of Antistreptococcus Serum Used in the Treatment of Scarlet Fever, *Am. J. Hyg.*, 9: 371, 1929.
12. Blake, F. G., and Trask, J. D. Observations on the Presence of a Toxic Substance in the Blood and Urine of Patients with Scarlet Fever, *J. Exper. Med.*, 40: 381, 1924.
13. Blake, F. G., Trask, J. D., and Lynch, J. F. Observations on the Treatment of Scarlet Fever with Scarlatinal Antistreptococcic Serum, *J. A. M. A.*, 82: 712, 1924.
14. Blake, F. G., and Trask, J. D. Observations on Therapeutic Value of Scarlatinal Antitoxin, *New York State J. Med.*, 25: 1093, 1925.

NOTE: The work here described has been done very largely by Misses Kirkbride, Wheeler and Hendry. Much of it has already been published, particularly the studies of the streptococcus and the standardization of the serum.[1-4]

Imagination and That "Cooked" Taste in Milk

WHILE in Olean several weeks ago in connection with a "Milk Week" program, a member of the department staff was taken to visit the plant of a young milk dealer. According to the dealer's own statement, at one time he had been an active opponent of pasteurization but early in the course of the serious typhoid fever epidemic which had visited the city he went out on his route one day and discovered that a number of his patrons had gone over to dealers in pasteurized milk. Within twenty-four hours he had decided to take up pasteurization, had ordered equipment and had never had any occasion to regret the change. For a period of about two weeks after he started pasteurizing he was unable to get new bottle caps and continued to deliver his milk with a "raw" milk cap. The day that his milk arrived for the first time bearing a "pasteurized" label he began to get protests from his patrons, who said: "We can't use pasteurized milk; we don't like the taste of it," etc. When he called their attention to the fact that they had been using pasteurized milk for two weeks without knowing it, most of them were converted.

This recalls another episode supporting the statement so frequently made that if milk is properly pasteurized even an expert cannot distinguish it from raw milk by the taste. About two years ago the annual meeting of the Pennsylvania Association of Dairy and Milk Inspectors was held at Harrisburg and at an evening banquet milk was served and each one of the approximately 100 "experts" was asked to drink some of the milk with the understanding that the reason for the request would be explained later. Subsequently ballots were distributed and each one was asked to express an opinion as to whether the milk was raw or pasteurized. After the vote had produced an approximately even division of opinion, it was announced that the milk had been pasteurized at 145 degrees.—*Health News*, N. Y. State Health Dept., Oct. 7, 1929.

Relationship of the Streptococci Causing Erysipelas*

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IT is interesting to recall that the first specifically named streptococcus was designated *Streptococcus erysipelatos* (Fehleisen in 1882). Later (1889), Widal and many others following him claimed that this streptococcus was identical with the *Streptococcus pyogenes* described and named by Rosenbach in 1884 for a chain coccus isolated from pyogenic lesion.

This idea of the unity of these strains prevailed until comparatively recent times and even yet, though the more minute serologic tests have added to our knowledge of the diversity and relationships of streptococci, the relationships of the streptococci isolated from erysipelatous lesions are far from being clearly demonstrated.

The chief tests that have been claimed as significant in differentiating these streptococci from other streptococci of the beta type are the absorption of agglutinins, the effect on so-called endotoxins of their antibacterial serums and the neutralization of exotoxins with their antitoxins. All of these tests require highly trained technical workers. Perhaps this is the reason why comparatively little minute and comprehensive work has been done with them and why such varied reports regarding them have been published.

The first work published on agglutinin absorption with an appreciable number of strains from erysipelas was by Birkhaug[1] in 1925. He claimed that out of 34 strains 91 per cent were agglutinated (and absorbed (?)) by "seven immune erysipelas serums" and that "of 45 strains of hemolytic streptococci from sources other than erysipelas, 9, or 20 per cent, were agglutinated by several immune erysipelas serums."

At that time we had begun to gather strains of hemolytic streptococci from erysipelas in connection with our work on scarlet fever, and on our request Birkhaug kindly sent us 11 of his strains. We isolated 19 strains from typical erysipelas cases at Bellevue Hospital,

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1 from a case following scarlet fever at Willard Parker Hospital, and 1 from a laboratory infection with a strain isolated from a scarlet fever throat.

When Birkhaug sent his strains he said they all belonged to one serologic group by absorption of agglutinins. When we found on testing these strains with carbohydrates immediately after receiving them that they fell into two groups—one of 8 strains into the pyogenes group (Holman's classification), and the other of 3 strains into Holman's subacidus group—we injected two lots of rabbits, each with a strain from one of these groups, in order to obtain an agglutinating serum, choosing C 3 from the pyogenes group and B 3 from the subacidus group. After obtaining a satisfactory serum we found that all but 1 of the pyogenes group from Birkhaug fell into the same agglutination group, and all 3 of the subacidus fell into another agglutination group. We called the first group E Type I and the second group E Type II. Of 21 strains of our own, 7 fell into the E Type I group, 1 into the E Type II group, and 13 into neither. Later we found that 3 among the 13 unclassified cross absorbed with our scarlet Type IV group, and 1 with our scarlet Type I group. We also found that 2 strains out of 29 from meningitis cases in New York City, 1 strain from pneumonia blood, and 1 from pneumonia sputum out of several cases at Harlem Hospital, fell into our E Type I group.

The finding of this definite relationship between certain strains from erysipelas and certain from scarlet fever might have been predicted from the recorded instances of clinical relationship between the two conditions so labeled. That Birkhaug did not find a relationship to scarlet fever strains is explained by the fact that he worked with a comparatively few scarlet fever strains, these possibly falling into our Type Sub I group (our largest scarlet fever group), or into some other group. That the B 3 group—our E Type II—subacidus strains, escaped him is harder to understand, since we have found that this is an extremely clear-cut group. The agglutinated bacteria are always sharply differentiated in the brilliantly clear serum and the absorptions or non-absorptions with the strains are complete—no lowering of the titer unless it is completely lowered; that is, these 4 strains of E Type II stand out as giving no evidence of sub or lateral varieties up to the time of writing. Moreover, these strains rather easily gave good stable suspensions for antigens, while we have had some difficulty in getting usable antigens from most of the other strains from erysipelas.

Another interesting fact we discovered might explain why some non-comparable results have been reported. One of the strains given us by Birkhaug, C 63, the one that had not fallen into any of our

agglutinative groups, we used to obtain another serum, with the object of finding a new agglutinative group among the strains that remained ungrouped. What was our surprise to find that this strain contained only common agglutinogens for all of our type strains from scarlet fever, as well as for E Type I strains. Only E Type II strains did not absorb from it. One strain from scarlet fever—68^2—that had not fallen into any group, we found to have the same characteristic. The cross absorption test is shown in Table I. Other members of the different groups showed similar reactions.

TABLE I

STRAIN OF HEMOLYTIC STREPTOCOCCI FROM ERYSIPELAS SHOWING ONLY COMMON AGGLUTINOGENS

Absorbed Serum	Absorbing Strains	Serum Strain	Agglutinations							Antigen Control
			100	200	400	800	1,600	3,200	6,400	
C 63		C 63							−	−
C 63	C 63	C 63	−	−	−	−	−	−	−	−
C 63	C 3 (E F)	C 63	−	−	−	−	−	−	−	−
C 63	55^4 (S Sub I)	C 63	−	−	−	−	−	−	−	−
C 63	115 (S I)	C 63	−	−	−	−	−	−	−	−
C 63	114 (S II)	C 63	−	−	−	−	−	−	−	−
C 63	57^3 (S III)	C 63	−	−	−	−	−	−	−	−
C 63	28^1 (S IV)	C 63	−	−	−	−	−	−	−	−
C 63	B^2 (E II)	C 63	+	+	+	+	+	+	−	−
C 63	C^{14} (E II)	C 63	+	+	+	+	+	+	−	−
C 63	C^{68} (E II)	C 63	+	+	+	+	+	+	−	−
C 63	E 9 (E II)	C 63	+	+	+	+	+	+	−	−
C 63	68	C 63	−	−	−	−	−	−	−	−
C 3	C 63	C 3 (E I)	+	+	+	+	+	±	−	−
B 3	C 63	B 3 (E II)	+	+	+	+	+	+	−	−
55^4	C 63	55^4 (S Sub I)	+	+	+	+	±	−	−	−
115	C 63	115 (S I)	+	+	+	+	±	−	−	−
114	C 63	114 (S II)	+	+	+	+	±	−	−	−
57^3	C 63	57^3 (S III)	+	+	+	+	+	−	−	−
28^1	C 63	28^1 (S IV)	+	+	+	+	+	±	−	−
68^2	C 63	68^2	−	−	−	−	−	−	−	−

Thus we have 2 strains that are of low grade in agglutinogens. Whether they were "degraded" in the stock cultures or whether they were colony degradents from the time of isolation we cannot say. We had only the 1 strain from Birkhaug, and while from our own 68^2 scarlet fever we fished 2 colonies, the other 1 had been discarded long before. Andrews[7] states he found that about 50 per cent of his colony strains from certain cultures of the salmonella group stimulated only group agglutinins. Krumwiede and Cooper[8] in investigating this observation found that they sometimes could get only 1 in 100 colonies that showed this phenomenon. If such a strain as C 63 had been the first to be chosen by any worker, and cross absorptions had not been done,

he would have found a large group of "related" hemolytic streptococci by "agglutinin absorption."

We see then that we have found 1 comparatively large agglutination group among the erysipelas strains, 1 small one and several strains related to our scarlet fever strains, while there still remains quite a large group not belonging to any of the above, as yet unclassified by absorption of agglutinins. Moreover, we found several strains from sources other than erysipelas falling into E Type I group. We realize that this is a comparatively small number of strains. In a larger series, or in a series obtained in other parts of the world, we would no doubt get a different percentage in the groups, and find other groups.

Our percentage of strains falling into Birkhaug's big group is decidedly smaller than his—46.9 against his 91.2 per cent. In our second group there are 12.5 per cent of strains. Then we have 9.4 per cent in our scarlet fever groups, and our unclassified strains make up 31.2 per cent. We have so far found 4 strains out of about 100 tested from sources other than erysipelas that fall into our E Type I group, while 3 scarlet fever strains cross absorb with 3 erysipelas strains. This makes about 7 per cent of strains from sources other than erysipelas that are related to erysipelas by agglutinin absorption against Birkhaug's 20 per cent.

THE PROTECTIVE ANTIBODIES AGAINST THE WHOLE ORGANISMS ("ANTIENDOTOXINS")

We have found that on the whole these antibodies run with the agglutinins in specificity, that is, we have found no marked cross protection between the groups, and no cross protection with scarlet fever strains and other strains that do not fall into the groups.

For this reason and because the chief lesion in erysipelas is probably due to the endotoxins, we should have these antibodies in our serums as well as, and perhaps more than, the antitoxins.

EXOTOXIN PRODUCTION

All of the strains chosen as type strains of the different groups, and many of the individuals in the groups, as well as many other strains tested, have each produced exotoxin in variable degrees. Several have produced an exotoxin as strong as did most of our scarlet fever strains, but the majority do not.

We have tested the toxins of EC 3 and EB 3 on a large series of children between the ages of 3 and 10 years in comparison with our standard toxin with the results shown in Table II.

Birkhaug claims that the toxin of his erysipelas strains gives a

significant skin reaction in people susceptible to erysipelas and in those just coming down with the disease. But we have found no definite evidence of this. On a series of patients tested soon after they entered the hospital with 2 skin-test doses (as far as we were able to determine) each of 3 toxins—one our scarlet fever standard toxin, and the other two—EC 3 and EB 3—from erysipelas, we obtained irregular results which are given in Table III.

Of course, the question of determining the correct skin-test doses is a difficult one. The effect of serum given the same day, or 24 hours before the skin test, was in this series of cases not apparent. If the chief lesion in erysipelas is due to the "endotoxins" we would not necessarily expect a markedly regular skin-test dose.

It is easy to obtain a strong antitoxin against an exotoxin of any strain, but to show the specificity of this antitoxin in human beings is another matter. It is a question primarily of the complexity of the toxins and of the dosage. We have recently[4] called attention to this complexity first clearly brought out by Park[5] in 1925.

We have tested several erysipelas toxins besides B 3 and C 3, each on a small series of children, against our scarlet fever serums and against scarlet fever convalescent serum. We have also tested our scarlet fever toxins against erysipelas antitoxin, and found cross neutralization in the majority of children tested. For this reason as far as the exotoxic activity of these strains is concerned we infer that an antitoxin stimulated by the exotoxin of any strain, be it from scarlet fever, meningitis, erysipelas or any other disease process, would, if strong enough, protect against further injury by the exotoxins of most strains in most people.

The clear-cut analysis by McCann[6] of alternate cases of erysipelas treated with erysipelas antitoxin and scarlet fever antitoxin gives evi-

TABLE II

COMPARATIVE RESULTS ON CHILDREN OF STANDARD TOXIN DOSES OF "SCARLET FEVER" AND "ERYSIPELAS" EXOTOXINS

Number of Children 86	Results of 2 Skin Test Doses		
	Scarlet Fever Toxin (Standard)	E Type I Toxin	E Type II Toxin
12	+	+	+
18	+	+	−
10	+	−	−
4	+	−	+
12	−	+	+
4	−	−	+
4	−	+	+
22	−	−	−

TABLE III

RESULTS OF 2 STANDARD TOXIN DOSES OF "SCARLET FEVER" AND "ERYSIPELAS" EXOTOXINS ON ERYSIPELAS CASES

Toxins	No. Tested on Days Ill																	
	1		2		3		4		5		6		7		8		9		10	
	+	−	+	−	+	−	+	−	+	−	+	−	+	−	+	−	+	−	+	−
EB 3	0	2	5	2	6	11	5	6	2	7	5	2	3	2	1	1	1	4	1	3
EC 3	0	2	1	6	5	12	3	8	3	6	2	5	2	3		2	2	3	2	2
Sc. F. 55	0	2	0	5	2	14	2	9	3	6	1	6	2	3		2	2	3	1	3

Toxins	11		12		13		14		15		16		20		21		23		35	
	+	−	+	−	+	−	+	−	+	−	+	−	+	−	+	−	+	−	+	−
EB 3	1	1		2		1		1		1		1		1	1	1		1	1	0
EC 3	1	1		2		1		1		1		1		1	1	1		1	1	
Sc. F. 55	1	1		2		1		1		1		1		1	1	1		1	0	1

23 of the 82 cases had no serum.

dence in favor of the hypothesis that antitoxic serum alone is not sufficient to give significant results in curing erysipelas.

Unfortunately we have as yet had no practical application of the comparative worth of antitoxic against antibacterial serum. Symmers's cases[7] were treated with a serum having presumably both antitoxic and antibacterial antibodies, but we do not know the absolute or relative strength of those antibodies since no tests of their titer were reported. Neither were they reported for Birkhaug's serum.

Since none of the three serologic tests described—the agglutination test, the protection test against endotoxins, and the exotoxin neutralization test—shows one definite erysipelas group, the name *Streptococcus erysipelatos* seems to be without specific significance, and might be dropped with the name *Streptococcus scarlatinae* as a species name, for the present at least, in favor of the name *Streptococcus hemolyticus* with the designation of the agglutinative type following it.

REFERENCES

1. Birkhaug, K. E. *Bull. Johns Hopkins Hosp.*, 36: 248, 1925.
2. Andrews. *J. Path. & Bact.*, 25: 505, 1922.
3. Krumwiede and Cooper. *J. Immunol.*, 10: 55, 1925.
4 To appear in a forthcoming *J. A. M. A.*
5. Park and Spiegel. *J. Immunol.*, 10: 829, 1925.
6. McCann. *J. A. M. A.*, 91: 78, 1927.
7. Symmers and Lewis. *J. A. M. A.*, 89: 880, 1927.

NOTE. A group of workers in our Bureau of Laboratories have been giving material assistance in this work. Chief among them are M. C. Schroder, C. R. Gurley, F. Berman, A. Brassel, P. Seiler and J. B. Ruhl.

An Improvement in the Quantitative Assay of the Antiscurvy Vitamin (C)*

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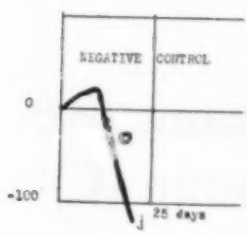
WHILE the experimental data presented in this paper have to do with a review of present methods of evaluating antiscorbutics and the claims of Höjer's methods as contrasted with the Sherman method (now generally in use in the United States), the subject has a very direct bearing on health problems and practices, for the method of Höjer assumes a very specific response of teeth to presence or absence of vitamin C. That this response is specific and supports the suggestions for dental nutrition practice, first emphasized by Dr. Percy Howe and more recently by Hanke and Wells, will appear as we outline our experimental findings obtained in parallel studies of vitamin C assay methods.

The Sherman method[1] was first presented in 1922. LaMer, working with Sherman and Campbell, developed a diet for guinea pigs which was markedly superior to the hay-oats-water diet, up to that time generally used to produce experimental scurvy in these animals. Its superiority was based on evidence, considered satisfactory at the time, that it contained all the nutritional factors necessary for normal growth except vitamin C. Guinea pigs of 300 gm. on this diet developed acute scurvy and died of that disease in from 25 to 30 days. The smallest amount of addendum necessary completely to prevent scurvy for a period of 90 days when added to this diet in daily doses, was called the minimum protective dose, and since that dose was inevitably expressible only in amount of food carrying the same, Sherman's unit quantity of antiscorbutic, like that of Holst, was defined as the smallest quantity of food source necessary to total absence of scurvy symptoms in a 90-day test using guinea pigs and the above basal diet.

Since 1923, Kohman and I have used the Sherman method[2] in studying a wide range of fresh and canned vegetables and fruits.

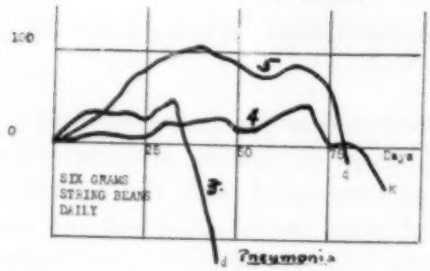
* Read before the Food, Drugs and Nutrition Section of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 4, 1929.



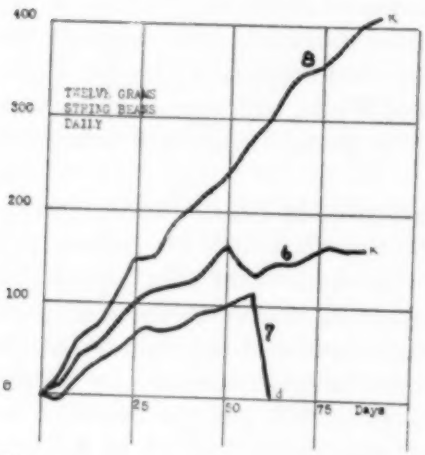
Brittleness	Pig 0.
Bones	***
Jaw	***
Teeth	***
Beading	***
Hemorrhages	
Muscle	***
Joints	***
Ribs	***
Intestines	***

BASAL DIET USED

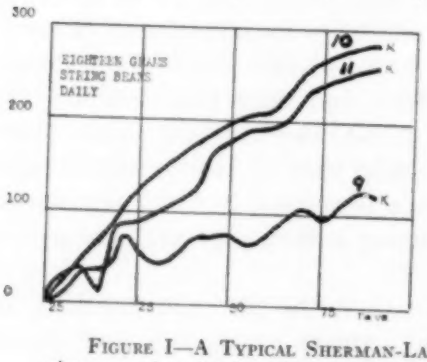
ROLLED OATS	50 PARTS
WHEAT BRAN	9 PARTS
BAKED SKIM MILK PWD.	30 PARTS
BUTTER FAT	8 PARTS
COD LIVER OIL	2 PARTS
SODIUM CHLORIDE	1 PART
TOTAL	100 PARTS



Brittleness Pigs	3	4	5
Bones	*	*	*
Jaw	*	*	*
Teeth	*	*	*
Beading	*	**	*
Hemorrhages			
Muscle	*	*	*
Joints	*	*	0
Ribs	*	*	*
Intestines	*	0	0



Brittleness Pigs	6	7	8
Bones	*	*	0
Jaw	0	0	0
Teeth	0	*	0
Beading	*	*	0
Hemorrhages			
Muscle	*	*	*
Joints	0	*	0
Ribs	0	*	0
Intestines	0	**	0



Brittleness Pigs	9	10	11
Bones	*	0	0
Jaw	0	0	0
Teeth	0	0	0
Beading	0	0	0
Hemorrhages			
Muscle	0	0	0
Joints	0	0	0
Ribs	0	0	0
Intestines	0	0	0

FIGURE I—A TYPICAL SHERMAN-LAMER TEST. Weight curves are shown of guinea pigs on various intakes of canned string beans and also the autopsy scores of each of the pigs on these diets. By this method we obtained complete protection from scurvy symptoms on a dosage of 18 gm. of canned string beans daily. In this series we used the basal diet given.

Statistically our numbers of test animal records now run into the thousands and provide material for some comparative observations of interest and profit. During the past year, therefore, my laboratory has devoted considerable time to such critical review of existing data and, through the coöperation of Dr. Gilbert Dalldorf of the Department of Pathology of the New York Hospital, we have extended our review by new experiments aimed to evaluate criticism of the Sherman method and of some of the substitutes offered, notably that of Höjer.[2]

IS THE ORIGINAL SHERMAN-LAMER BASAL DIET COMPLETE IN ALL GROWTH FACTORS EXCEPT VITAMIN C?

Their basal diet as given in 1922 consisted of the following:

	Per cent
Ground whole oats	59
Baked skim milk powder	30
Butterfat	10
Salt (NaCl)	1

We are using today the following modification of this diet:

	Per cent
Baked skim milk	30
Butterfat	9
Salt	1
Rolled oats and wheat bran (½ & ½)	59
Cod liver oil	1

plus a certain amount of yeast fed separately.

The bran was added to supply roughage in greater quantity, the cod liver oil as insurance against vitamin D deficiency, and in certain cases we had direct evidence of lack of one or more of the vitamin B factors, making yeast of value in supplementing the oats and milk content of these factors.

Sherman introduced a scurvy symptom score based on autopsy findings. Figure I shows the nature of this score and its use in determining minimal protective dosage of a tested antiscorbutic.

In spite of score and correction of basal diet defects the test has been criticised. The experimental pathologists took a hand in the matter. In his treatise on "Scurvy," Hess has adequately summarized the pathology of the disease up to the date of publication (1920). So far as I can find, Jackson and Moore,[4] 1916, were the first to note scorbutic changes in teeth. These observations were confirmed by Zilva[5] in 1919, but greatly extended by Höjer[3] in 1924. Aschoff and Koch[6] in 1919 also turned their attention to the pathology of scurvy,

and it is their viewpoint as to the function of vitamin C that led to the theory advanced by Wolbach and Howe[7] in 1926. We will return shortly to this work of Wolbach and Howe and their theory. From the viewpoint of methodology in assay, the work of Höjer especially concerns us. This Swedish pathologist supplemented his first studies, published in 1924, by a scheme for utilizing tooth pathology as a quantitative measure of antiscorbutic value. His scheme was published in detail in 1926.[8] It was critically reviewed by Goettsch and Key[9] in 1928. The following quotations from the 1926 paper of Höjer explain briefly why this scheme constitutes both a challenge of the Sherman method and a claim for efficiency requiring study:

> Sherman and others, in 1922, therefore proposed to limit the experimental time to 70 or 90 days and then to make a macroscopic post-mortem examination to make sure that there were no internal hemorrhages or other signs of scurvy. Sherman also introduced the rating of the scorbutic signs in animals which were not fully protected, and thus he estimated the dose of antiscorbutic given in quarters of the fully protective dose. Even with these improvements of Sherman's this method of determining the fully protective dose is very inaccurate, and often gives variations of 100 per cent or more.
>
> . . .
>
> Naturally a biological method cannot afford the accuracy or the simpleness of a chemical one. It is indeed the lack of a chemical method for the determination of the antiscorbutic value that has called in experimental pathology as a temporary aid to the physiologist. As a biological method, and in comparison with that hitherto used, my method has the following advantages: First, it is accurate in fixing the fully protective dose. This is of value particularly in physiological work. Secondly, the method requires only 3 weeks instead of 3 months. This is an essential factor in hygienic work. Lastly, being shorter, it is more economical than the older methods.

What is this method? In brief it rests on the claim that the teeth show specifically in 3 weeks or less the absence of an adequate amount of vitamin C in the diet. Höjer's own description[8] of his technic follows:

> As previously, young guinea pigs from a certain day on are given a basal diet free from antiscorbutic, but otherwise complete, and to this diet are added quantitatively daily doses of the juice to be examined. For a sharp determination of the fully protective dose it is advisable to have several animals on different doses. In addition there ought to be two control animals on the basal diet alone, and two on the basal diet with a fully protective dose of a known antiscorbutic. After a period of 10–14 days all the animals are killed. The one-half of the lower jaw is taken out and decalcified in a 5 per cent tri-chloracetic acid solution. It is then embedded and sectioned after 1 week. The section is made through the foremost molar at right angles to the longitudinal axis of the jaw. Some sections are stained with hematoxylin-eosin, and others with tri-oxyhematin according to the method of Hansen.

Such sections according to Höjer not only reveal histological pictures characteristic of scurvy or its absence, but it is possible from pictures of partially protected animals to predict the fully protective dose, as shown in Table I.

TABLE I

DETERMINATION OF THE ANTISCORBUTIC VALUE OF FOOD BY HÖJER'S METHOD[8]

	Part of Protective Dose
1. Dentine of normal size; its inner and outer layer uniformly colored; predentine regular, uncalcified; dentine and predentine holding collagen—	
a. Odontoblasts long, slender, parallel, of equal height	1.0
b. Odontoblasts partly shorter	0.9
2. Dentine very thin, uniformly colored; odontoblasts parallel, short	0.8–0.3
(The degree of osteoporosis, hyperemia and collagen permits the distinguishing of different stages, but not very sharply. Those animals whose dentine formation seems to have been arrested are therefore excluded.)	
3. Dentine in inner and outer layer differently colored.	
a. Odontoblasts on the larger pole of the incisor cross-section short and parallel	0.8–0.3
(1) The Tomes' canals going parallel through a normal predentine	0.8
(2) The uncalcified predentine defective formation of network bone beginning	0.7
(3) Uncalcified predentine lacking	0.7–0.5
(4) Network bone formation greater	0.4
(5) Tomes' canals in the old dentine widened	0.3
b. Odontoblasts on the larger pole of the incisor cross-section no longer in continuous layer	(0.3–) 0.2–0.0
(1) Tomes' canals in the outer layer of new bone	0.2
(2) No Tomes' canals in the new bone, osteoporosis and hyperemia well developed	0.1
(3) The old odontoblasts in greatest disorder, osteoporosis and hyperemia very evident	0.0

A tooth section showing the picture 3, a, (1), with 0.5 gm. of antiscorbutic daily would permit prediction that the fully protective dose of that antiscorbutic would be 0.622 gm. (0.5 gm. = 0.8x).

The value of Höjer's method obviously depends upon substantiation of claims for specificity. Do the tooth changes he reports result solely from the absence or inadequacy of vitamin C in the diet? Are they affected in any measure by absence or presence of vitamin D? Can we rely on the pictures of partial protection he presents to predict full protective doses?

To date two critical studies support his claim that tooth changes picture specific and early response to absence or inadequacy of vitamin C.

Goettsch and Key[9] have reported comparisons of Höjer's method with the older type. They studied particularly the question of whether the tooth changes noted had any correlation with symptoms of rickets and found none. The actual tooth changes were as de-

TABLE II

TABLE AFTER GOETTSCH AND KEY[9]

No. Guinea Pigs	Line Test	Blood serum mg. Ca per 100 c.c.	Mg. P per 100 c.c.	Per cent ash of dried and extr. femurs	Diagnosis
18	No rickets	9.9	5.8	59.4	Death by scurvy
24	"	11.3	5.3	55.0	"
28	"	12.0	5.3	57.9	"
35	"	9.4	5.0	56.2	Partly protected by 0.5 c.c. orange juice
36	"	10.1	5.0	57.4	Partly protected by 0.5 c.c. orange juice
38	"	10.9	5.0	59.0	Partly protected by 0.5 c.c. orange juice
31	"	9.8	5.0	54.2	Completely protected by 3 c.c. orange juice
32	"	9.1	5.0	56.2	Completely protected by 3 c.c. orange juice
34	"	9.0	4.5	56.2	Completely protected by 3 c.c. orange juice

scribed by Höjer and in their hands confirmed his criticism of the Sherman method, for whereas the Sherman method fixed 1.5 c.c. as the protective dose for orange juice, prevention of the scorbutic symptoms in teeth required a daily dosage of 3 c.c. of orange juice. Their only stricture is the reliability of prediction from the results with partially protected animals and they feel that individual variation in animals calls for fairly large numbers on these intermediate tests if the predictions as to full dosage are to be relied upon.

Wolbach and Howe[7] gave more attention to Höjer's histology and his theory of its cause than to his use of the study of antiscorbutic testing. They say:

> We do not question the accuracy of Höjer's description. His findings are different in important respects from ours, as we found in the state of complete scorbutus no formation of "osteodentin" or pulp bone. We believe that his diets were not completely deficient, because we obtained both conditions answering to his descriptions only in guinea pigs fed alternately on deficient and normal foods. . . . Our results corroborate completely and extend the deductions of Aschoff and Koch, so that we characterize the scorbutic state as one due to the inability of cells of supporting tissues to produce intercellular substances and to maintain existing intercellular substances.

Later in their paper[7] they further hold that Höjer's theory to account for changes as due to degeneration or the change of odontoblasts to osteoblasts is not proved. Rather they consider that the odontoblasts do continue to function, but through lack of a substance supplied by vitamin C their proliferated "jell" fails to set into dentine.

> . . . We therefore advance the theory that the failure of cells to produce intercellular substance in scorbutics is due to absence of an agent common to all supporting tissues which is responsible for the setting or jelling of a liquid product.

The immediate purpose of the present paper is to make clear the possibilities offered by the Höjer test for rapid assays of antiscorbutic values and to present evidence from our own studies of its validity. To that end we have devoted considerable time during the past year to checks and comparisons with our previous assays and also some study of material hitherto unpublished. We report here three such specific comparisons.

I. CANNED STRING BEANS TESTED BY BOTH METHODS

In Figure I is presented a series of studies of canned string beans by the Sherman method. Using both growth curves and scoring system this study showed 18 gm. of canned string beans per day to be the minimum protective dose. This series was then repeated using the Höjer procedure in part. Figure II represents tooth sections obtained in this study.

Photograph A of Figure II shows a magnified tooth section from an animal receiving 18 gm. string beans daily at the end of 30 days on the diet. (This was the protective dose by the Sherman method.) Even in this period the beginnings of scurvy are evident, though slight. The odontoblasts are irregular and beginning to separate from the dentine. A layer of jelly is beginning to form. Photograph B shows a much more distinct disturbance in tooth structure. The period on diet is the same (30 days), but the dosage of antiscorbutic was only one-third as much (6 gm. string beans daily). True dentine is markedly reduced. The odontoblasts are very irregular and have formed much false dentine. This material was partly bone-like, tending to support Höjer's claim that the character of the odontoblast output is actually changed in quality.

Photograph C is given to show the odontoblasts in higher magnification, and photograph D shows that the effect of inadequate antiscorbutic was already manifest in 20 days on the diet. With this method we were unable to reach a dosage of string beans that completely protected teeth. Even 18 gm. per day had already become difficult to use without reduction of the basal intake below efficiency in other factors.

The series shows clearly, however, that if the tooth is a true index of antiscorbutics, it is a much more sensitive one than the Sherman scoring system; that tooth protection demands more antiscorbutic than does the prevention of external symptoms of scurvy. This particular study definitely confirmed the claims of Höjer and others that the guinea pig's tooth responds very promptly to variation in vitamin C.

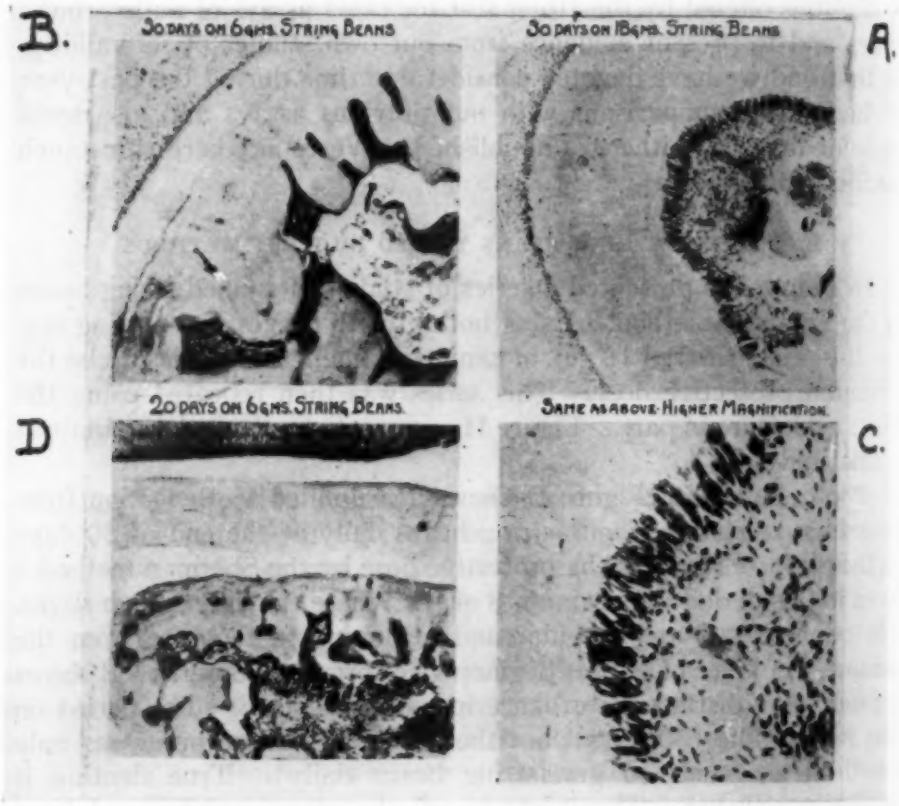


FIGURE II—TYPICAL HÖJER TEST RESULTS

In this series tooth sections were made at the end of 20 and 30 days on basal diet plus different intakes of canned string beans. Photographs A, B, C, and D are microphotographs of tooth sections from typical animals.

Photograph A—This shows the tooth of a guinea pig that had received for 30 days a daily dosage of 18 gm. canned string beans. The tooth shows slight scurvy. The broad band of dentine is separated from the cells which form it (odontoblasts) by a narrow band of jell-like material.

Protograph C—This shows a region of the section given in A highly magnified to show the soldier-like row of odontoblasts, the dentine with its fine striations of Tomes canals and the beginnings of the separation layer between odontoblasts and dentine.

Photograph B—In contrast to the above note in this section the very narrow band of dentine, the complete confusion of arrangement of the odontoblasts, the soldier-like rows are gone and the cells are in irregular islands in the pulp cavity. Between islands and dentine is a mass of semi-solid jell quite unlike true dentine. This effect was produced by inadequate antiscorbutic, 6 gm. canned string beans instead of 18 gm. daily.

Photograph D—Note that even in 20 days the effect of inadequate antiscorbutic is plainly evident.

II. ORANGE JUICE SERIES

During the past year we were asked to compare the antiscorbutic value of California and Florida oranges. Picking by size in the open market we carried out the regular Sherman test. Both types proved by this method fully protective in daily doses of 1.5 c.c., neither showing any appreciable superiority as an antiscorbutic over the other. This series, however, also permitted us at the same time to check Goettsch's[9] criticism of Höjer's method as well as to compare again Höjer's method with Sherman's in our laboratory. The check with Goettsch was remarkably good. In our hands 3 c.c. of either California or Florida orange juice was necessary to prevent tooth changes characteristic of scorbutus, exactly the relation obtained by Goettsch in her comparison (see Figure III, photographs A and B).

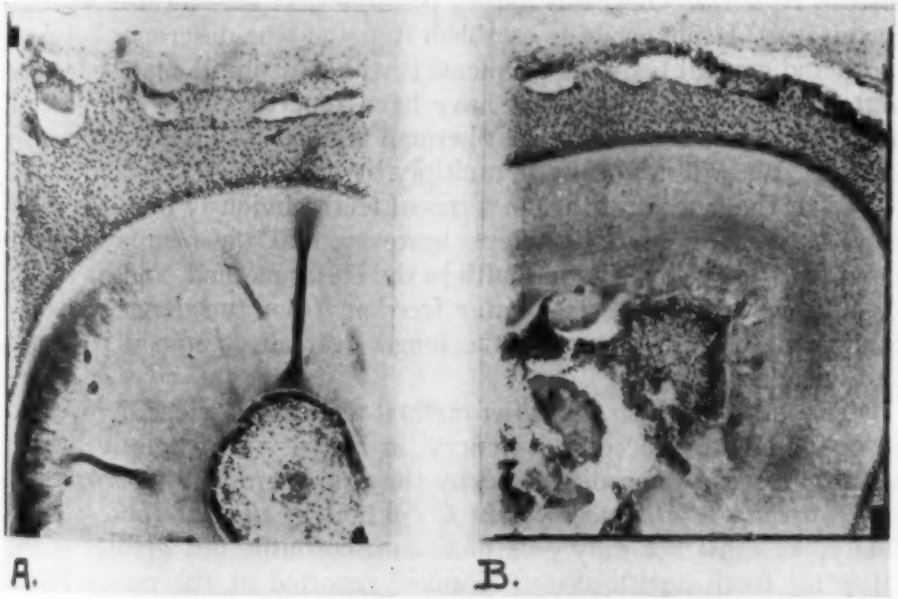


FIGURE III—THE EFFECT OF ORANGE JUICE ON TOOTH FORMATION

Photograph A—Tooth section from guinea pig on 3 c.c. of orange juice daily for 20 days. Note normal thick dentine, perfectly regular row of odontoblasts in direct contact with lower edge of dentine.

Photograph B—Tooth section from guinea pig on only 2.5 c.c. of orange juice daily for 20 days. Note that 0.5 c.c. difference is plainly shown in disturbance of tooth structure. Odontoblasts have become irregular and begun to separate from dentine.

The tooth therefore is quickly responsive to very slight differences in antiscorbutic dosage.

III. BANANA ANTISCORBUTIC VALUE BY HÖJER METHOD

In 1926[10] I reported to this Association a study of the antiscorbutic value of the banana. Five gm. daily was the minimum protective dose determined by the Sherman method at that time. We have now retested the banana by the Höjer method. In doing it we introduced a modification suggested by Dr. Wolbach, that is, to include as positive controls in each series one animal fed for 5 days on a recognized adequacy of antiscorbutic following his 16 days on the banana intake. This procedure enables one to judge with more exactitude as to when the fully protective intake is reached. Figures IV and V show the tooth results.

Exactly as in the case of orange juice, the antiscorbutic dose of banana for tooth protection was found to be double that previously obtained as minimum protective dose by the Sherman method, 10 gm. instead of 5 gm. It seems hardly possible that this ratio is entirely fortuitous. If further tests establish it as the true difference between tooth and general body requirements it will be a simple matter to convert antiscorbutic values that have been reported since the general adoption in this country of the Sherman method into tooth protective values. We will need only to multiply by two.

What the true values are in terms of teeth obviously requires much more extended study. I believe, however, that the results reported herewith justify considerable faith in the Höjer method, and its speed, its relative simplicity, its greater freedom from the danger of contaminating disease factors in the longer test all commend it to our careful appraisal.

The facts on which the Höjer method rest have a wider significance in public health procedure. Scurvy, in fact, is still a relatively rare hospital disease when diagnosed by the usual signs. *If tooth health is so directly related to vitamin C content of diet as these studies imply,* we must not only give more antiscorbutic, but greater quantities for tooth health alone. Hanke[11] reported at the recent International Physiological Congress in Boston studies that confirm this view: He studied 100 cases, afflicted with every type of dental disorder, in subjects ranging from 4 to 60 years of age. He found the diets not markedly lacking in vitamin D, but *40 per cent were markedly deficient in vitamin C.* He says:

> It is possible, by means of a diet containing an abundance of vitamin C, to produce solid gum tissue, to arrest caries and, with the aid of prophylactic measures, to cure pyorrhea and induce bone regeneration in the alveolar tissue.

This view of Hanke's has been urged with much emphasis by Dr. Percy Howe.

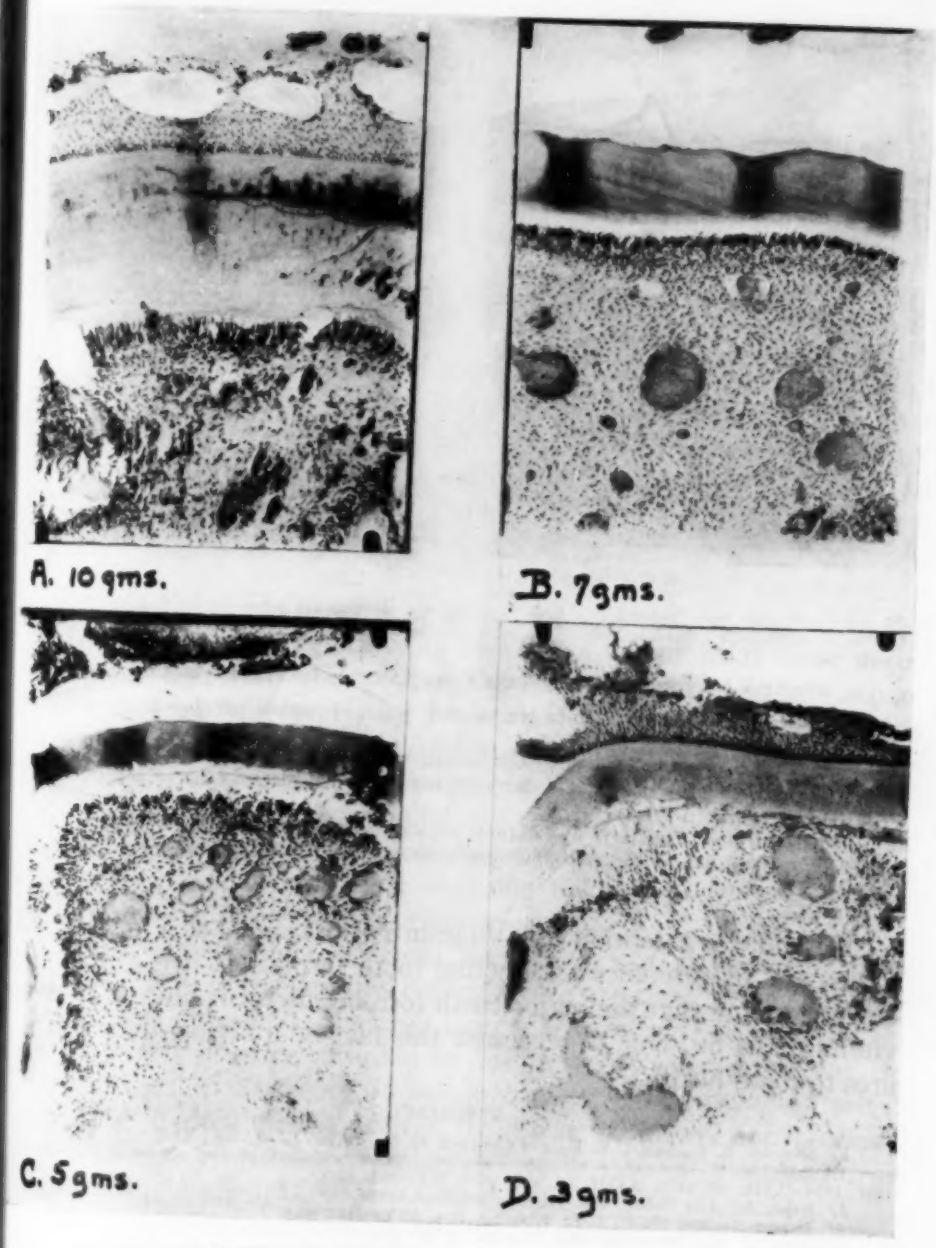


FIGURE IV—THE BANANA AS AN ANTISCORBUTIC

A—Ten gm. banana daily completely protective to teeth.

B—Seven gm. banana daily insufficient. Reduced dentine, odontoblasts still in regular rows but separated from dentine.

C—Five gm. banana daily gave still less dentine and beginning of irregularity in odontoblasts. This is the minimum protective dose by Sherman Method.

D—Three gm. banana daily shows complete derangement of odontoblasts.

As in the case of orange juice tooth protection requires double the amount of antiscorbutic per day as was shown adequate against general scurvy symptoms by Sherman test and score.

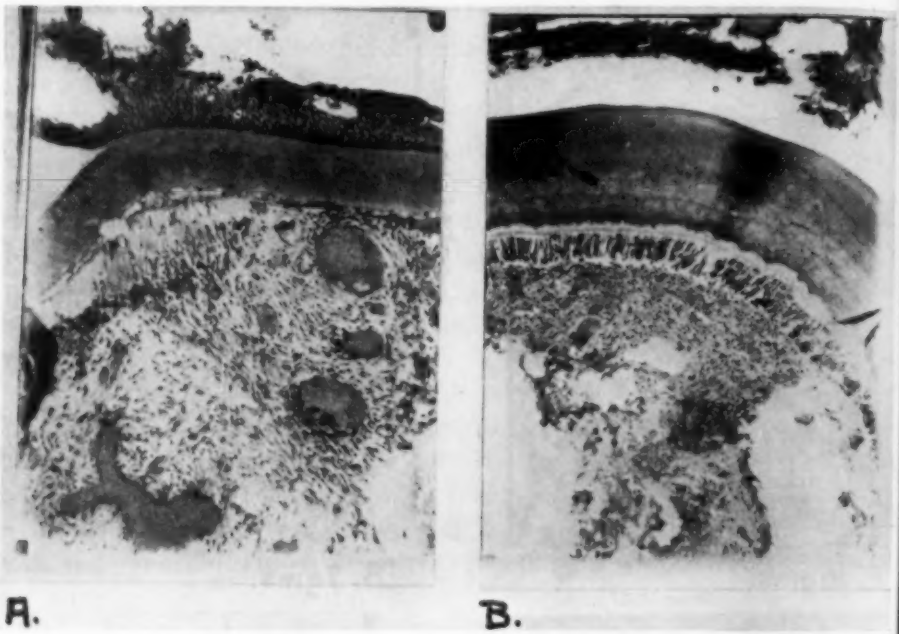


FIGURE V—SHOWS SPEED OF SCURVY CURE WHEN ANTISCORBUTIC IS ADEQUATE

A—Section of tooth of guinea pig on only 3 gm. of banana per day at the end of 21 days.

B—Section of tooth of another test animal who was fed 3 gm. banana daily up to the 18th day and then placed on a diet with completely adequate dosage of antiscorbutic for 5 days more.

Note contrasts. Five days had restored regularity to odontoblasts and brought about formation of a considerable amount of new dentine. See line of separation between new and old dentine.

With all the attention that vitamin D is receiving as a bone-former today, and by inference as affecting tooth formation, it is at least significant to find that the major tooth forming factor is quite a different vitamin, and of value to recognize this fact in applying dietary measures to tooth health.

REFERENCES

1. Sherman, H. C., LaMer, V. K., and Campbell, H. L. *J. Am. Chem. Soc.*, XLIV: 165, 1922.
2. Eddy, W. H., Kohman, E. F., and Coworkers. Series in *Indust. & Eng. Chem.*, I-VI, XVI, 52: 1261, 1924; XVII: 69, 1925; XVIII, 85: 302, 1926; XX: 202, 1928.
3. Höjer, A. *Acta Pediat.*, Vol. III, Supplementum, 1924.
4. Jackson, L., and Moore, J. J. *J. Infect. Dis.*, XIX: 511, 1916.
5. Zilva, S. *Proc. Roy. Soc. Med.*, London, B 90: 505, 1919.
6. Aschoff, L., and Koch, W. Scorbut, Eine Pathologisch-Anatomische Studie, Jena, Gustav Fischer, 1919.
7. Wolbach, S. B., and Howe, Percy R. *Arch. Path. & Lab. Med.*, I: 1, 1926.
8. Höjer, A. *Brit. J. Exper. Path.*, VII: 356, 1926.
9. Goettsch, M., and Key, K. M. *Quarterly J. Pharm. & Allied Sci.*, I: 168, 1928.
10. Eddy, W. H., and Kellogg, M. *A. J. P. H.*, XVII. 1: 27, 1927.
11. Hanke, M. T. *Abstracts XIII Internatl. Physiol. Congress*, 1929, p. 10.

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Training Teachers in Health Education*

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THERE is increasing recognition, on the part of workers in child health, of the tremendous influence which the classroom teacher has in encouraging good health habits, influencing the child's attitudes and desires, contributing to his ability to coöperate intelligently, and stimulating a real enjoyment in the building and maintaining of a fine, strong body. The more progressive schools are now initiating their own health programs, and are calling on specialists for assistance according to the needs of the children. This places the teacher in the strategic position of determining to a large extent what these needs are. It is therefore evident that the results obtained in any school health program will largely be determined by the teacher's education in health. The most crucial point in which to give this instruction is in the plastic stage of the first years of teacher training.

Teachers' colleges and normal schools are vocational, presumably preparing young people to administer education, to build citizens. Among their responsibilities in realizing the objectives of education, the health of children takes a prominent place.

The problems which confront the person who is preparing these young teachers to assume this responsibility are three: first, the basic training and experience given on the college campus; second, the observation and practice afforded in the demonstration school as the testing ground of all theory previously taught; third, the field itself in which the student finally proves the value of instruction received. The problems of teacher training in health will be discussed from these three standpoints.

The conditions surrounding life on the campus loom very large in any consideration of education of a student in health. What he is experiencing daily is being written into his consciousness in vivid terms in comparison with the impression made in many class periods. Much of his experience is definitely connected with his environment,

* Read at a joint session of the American Child Health Association and the Child Hygiene and Public Health Education Sections of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 3, 1929.

which, beside being a silent force in education, should also be a reservoir of opportunities for teaching health actively. The public health supervision of the campus should exemplify the very best practice of scientific principles, and should be several leaps ahead of many fields in which the student will work in the future. In other words, it should set the pace in the development of healthful programs for pure water, food supervision, garbage disposal, good ventilation, sanitary cleaning methods, and communicable disease control.

The college campus in reality represents the problems of a small community, where the students are learning positive principles of public health administration which will later be translated into the practices of their communities. A teachers' college in which this vast field of learning is used to its fullest, should be able to pass creditably a survey of fountains, lavatories, water and milk supply, cafeteria, garbage disposal, dormitories, infirmary, and general conditions of cleanliness on all parts of the campus and in all buildings.

The environmental conditions, beside furnishing valuable teaching material, directly influence the personal hygiene and health of the student body, and, as such, should be a matter of close concern of the health department of the college. It is through this department that students are initiated into the health examination, learn their own physical rating, and receive instructions as to defects, habits, and attitudes related to study, recreational activities, diet, and other important points in daily life. The way in which students are able to carry out these instructions often depends upon the environmental conditions, which may either help or hinder efforts to attain a fine standard of health, physical and mental. The college infirmary, while serving as an emergency measure, should also be an educational opportunity for students who for some reason have failed in maintaining health.

Every student should receive in his college course the essentials of personal, school, and community hygiene. The emphasis in personal hygiene should be mainly on promotion of health, with enough physiology to give a background. Credit should be given for the success which the student attains in reaching and maintaining a high degree of health. Principles developed in personal hygiene should be constantly applied, not only to the life of the adult student, but also to that of children. In school and community hygiene courses, there should be constant applications to school environment and practices. These classes should frequently visit the demonstration school to observe problems of water and milk source, food service, seating, lighting, heating, ventilating and cleaning, and should study the way in which they are met.

Beside these courses which are *directly* related to the health education of the student, biology and allied sciences, psychology, home economics, agriculture, physical education, elementary education, and school supervision and administration make important contributions to the understanding of factors which influence the physical, mental, or emotional health of children. Instructors of these courses should share the responsibility of seeing that health principles taught in their classes are actually functioning in the demonstration school.

The content of these courses should also be influenced by problems of the field to which the students will go. State and local boards of health have first-hand information of outstanding community health problems, and are eager to pass on this information to instructors in teachers' colleges. A close relationship should exist between these official agencies and the college staff. Points on which schools are having difficulty as shown by reports from the field should be brought before classes for discussion and tentative solution. For instance, a practical problem in an adjacent community may be that of scarcity of milk and fresh vegetables. Time should be given in food courses to a consideration of basic causes for such conditions. Undernourishment of children, as a common field problem, might well receive attention in courses in nutrition. Responsibility for swimming pool sanitation on the college campus and in the demonstration school, offers a practical project for science classes. In communities in which hookworm, typhoid, and tuberculosis are outstanding problems, time should be devoted to these subjects in science and agriculture.

Even though instructors in all subjects seek to bring out the important health correlations, there is still very great need for a course which shall gather together all the contributions, and show the student clearly, first, how they are significant to the health of children, and second, how they may be applied. This course should be developed in close contact with problems of the demonstration school, and those of the field to which the student will be going. Methods should be developed to fit difficult conditions, such as the rural school with few facilities, for such methods may be adapted to surroundings which are more favorable.

Students should, in this correlation and methods class, develop initiative and originality in planning and carrying out health games, dramatics, field trips with follow-up, group projects, use of current events and newspaper articles, preparation of scrap books, study of some life situations, survey of existing material for health correlations, bulletin boards, silent reading lessons, debates, discussions, demonstrations, and the use of the auditorium period for presenting

any of these. Health examinations and inspections, playground equipment, the hand-washing, and hot lunch service of the demonstration school should be observed and discussed preparatory to later participation.

Definite work should be done in correlation with the various school subjects, such as those of science, social studies, physical education, home economics, and kindergarten and primary activities, so that the students will realize the broad way in which health as a quality of living is tied up with a multitude of life situations. In other words, students should clearly see health, not as a subject bounded by arithmetic on the one hand and geography on the other, but as a condition to be reckoned with 24 hours out of the day, and which constantly presents untold opportunities for influencing the lives of children. If all young teachers could go out with this conception and a genuine enthusiasm to meet the conditions which arise, the problem of child health in our schools would be well on the way to solution.

The second aspect of teacher training for health education is found in the demonstration school, which should be a testing ground of theories taught on the campus. Upon the functioning of health in each classroom depends the impression which the student receives of the practical application of these theories. The demonstration school represents again a small community in which all the principles of public health are carried on with and by the children as far as possible, illustrating the methods of meeting such child health problems as are found in the field. Throughout, the spirit toward health as represented by the principal and teaching staff, and which brings about a real health demonstration, has an immeasurable influence upon the entire student body.

Every student participating in classroom teaching should take part in solving health problems which arise in that room. Each should study children, under the supervision of the teacher, who will utilize the service of special workers in the school. This study should include, among all other phases of the child's development, his physical basis, with as much family background and past history as possible. Such a study enables the student to individualize the child's needs in terms of physical changes, habits, and attitudes, and to make the health program a vital thing to each child.

The demonstration school should be able to measure achievements of the children in every classroom in terms of some accepted standard in health. Every room should be able to show definitely what is being done to meet its problems; how far it has gone in improving

physical conditions, in building definite health habits, in influencing attitudes and desires, in increasing the child's intelligence, and in directing and interpreting his experiences.

In comparison with theory, the demonstration school leaves a vivid impression upon the student teacher. While it is placed second in our chronological consideration of aspects of the teacher training program, it should rightfully be placed first in importance. The success of the health program in the demonstration school will determine very largely the success of the health programs of hundreds of schools in the field. The demonstration school is the keynote in teacher training for health and should represent the culmination of effort on the part of the entire college and of the health agencies in the field in influencing teachers who assume the responsibility for the health of thousands of children.

The third aspect in the development of teacher training in health is found in the field, which is the final test of the student's ability to carry out what has been learned. Every teachers' college sends hundreds of young people out into most difficult territories where there are no organized health agencies and where no immediate assistance is to be had in the solution of health problems.

To help meet this challenging situation, a plan has been tried, in at least two states, of offering these teachers an opportunity to carry out an organized health project in the field, under the supervision of the health education department of the college and on the basis of college credit. In localities where this work has been carried on, interest has been developed which has extended into other schools in that community and which in many cases has carried over in succeeding years without credit.

Up to the present, conferences in the development of the projects have been carried on at intervals at the college. As the field work grows, however, it would seem that supervision should be provided in the field, the supervisor representing to the teacher an immediate helper, consultant and adviser. This supervisor should help the teachers tie up their work closely with local health agencies, and should also help to unify the work of all contributors in the interest of the children's health. Ideally, this supervisor should serve jointly the college and the state departments of health and education.

The field reports of the supervisor should bring into the state and college departments valuable data which should guide them in future efforts. A state health standard is of great value in establishing definite objectives to guide these projects. Every worthwhile project should show some results which contribute to the attainment of this

standard. In reality, every time a teacher launches a project in the field, she becomes an active assistant in carrying on the work of the state departments in health and education. Considering the great number of teachers in the field who have direct contact with children, the total results of this type of state-wide supervision can hardly be estimated. With the possible development of the health work on a state-wide basis, it would seem that a wise provision would be to have a health coördinator who would tie up effectively the work of all departments of the college, of the demonstration school, and of the field.

Whatever may be worked out as the possible solution of this problem, there should be evident a strong development which is definitely moving through the basic sciences and health courses in the teacher training schools, on through the demonstration schools as the preliminary testing ground, out into the field where the supreme test of its value is made, and back into the teachers' college for critical analysis, reëvaluation, and re-adaptation, thus contributing rich source material for the further development of the possibilities of teacher training in health education.

Mental Hygiene Rules

NO, it is not likely that regulation of behavior can be secured by handing out a set of "rules." As a matter of fact, few "rules" of mental hygiene as yet exist. Attempts in the past to place such "rules" in the hands of school children, adolescents or adults have invariably degenerated into the quotation of time-worn platitudes, as sterile as they are absurd. "Cheer up," "Think pleasant thoughts," "Don't worry," and a host of similar admonitions in the hearty voice of the professional Pollyanna are merely depressing to some people in need of mental hygiene, but irritating to others.

Platitudes are not mental hygiene. Exhortations do not relieve maladjustments. There are no royal roads to learning in this matter. There are no short cuts to mental health.

These are some of the reasons why leaders in the field of mental hygiene discourage most well-meant attempts to create courses in mental hygiene that can be given to school children and adolescents. To impart mental hygiene effectively, both the teacher and the taught should have behind them a reasonable measure of life experience, some knowledge of their fellow men, and, most essential of all, a modicum of personal objectivity that will permit them to apply to themselves, without too much emotional bias, the material being taught. Of such backgrounds children, most adolescents, and not a few chronologic adults possess all too little to make feasible the giving of mental hygiene instruction directly in its raw state.—*Mental Hygiene Bulletin,* Oct., 1929.

What O'Clock Is It in Industrial Hygiene?*

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THE title of this paper suggests that it should at least be timely, but to interpret the present and future of industrial hygiene it will be necessary to sketch in briefly some of the high lights of the background of this important branch of medical and public health work.

Industrial hygiene differs from personal and community hygiene, or sanitation, in that it is a combination of both applied over a limited area, and involves a variety of problems, the majority of which are concerned with the environment of the worker, the processes on which he is engaged, and the materials with which he works.

Industrial hygiene is not a new medical entity. Its problems have been recognized and written about for more than 200 years. Some of the observations made in the earliest years of its history by Ramazzini and others hold true at the present time. The effects of unfavorable working conditions on the human body have always been the same and will continue until they are brought under control by engineering or other protective measures.

The greatest stimulus of modern times to further investigations in the field of industrial hygiene has been the enactment of workmen's compensation laws in the various states. The passage of these laws for the first time gave a definite economic urge to the study of industrial conditions and environment. When the employer could save money by studying the operations of his business from the standpoint of hygiene and health, he was not long in undertaking it.

The first approach to this problem was through strictly medical work. Provision was made to care for the sick and injured in such a way as to hasten their recovery and return to work. Later, the place where the employee labored and the materials with which he worked were studied to see what influence, if any, these factors had upon his physical condition. Laboratory and experimental studies of raw ma-

* Address of the Chairman of the Industrial Hygiene Section of the American Public Health Association, delivered at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 3, 1929.

terials and methods of processing were undertaken to see what part they might play in the worker's health. It is through investigations of this type that industrial hygiene has made its contribution to medical and industrial science.

I like to think of industrial hygiene not as a separate scientific entity or field of work, but rather as a part of the greater problem of industrial medicine. The hygienic aspects are surely medical in concept and in application; the industrial part is engineering, chemical and mechanical. Medical knowledge is essential to a successful prosecution of studies in this field. When the medically trained mind has unravelled the knot, it requires the application of engineering skill to complete the elimination of the hazard either in construction or the process. In no other field of medicine is there such a close relation to the engineering profession. Either profession alone is unable to find the answer, and where there has not been close coöperation between the physician and the engineer the problem has remained unsolved.

I remember being called in to check over some recommendations made by a medical man relative to a dust hazard in a certain plant. The recommendation had been made—with a tone of finality that usually accompanies a lack of profound knowledge—that the installation of exhaust fans would remove the fine dust that was causing the complaint. Should the finely divided clay be removed, however, one essential ingredient of the product of this factory would be lost. The solution to this problem was not the removal of the dust by exhaustion, an easily accomplished undertaking, but rather making dust tight the process in which it was used. Here was a medical mind trying to function in one branch of the engineering field with results of no value to the practical solution of the problem in hand. Results as hopeless are produced with a similar application of engineering knowledge in the field of medicine.

Today, more than ever before, there must be close coöperation between engineering skill and medical knowledge in the solution of industrial hygiene problems. Industrial medicine is getting further and further away from the curative, and nearer and nearer to the preventive aspects of the relation of the worker to his work. Increased efforts are being made to see that men are placed at work for which they are best fitted, and fitness is being determined more carefully each year. Medical knowledge regarding materials worked with and processes employed is constantly accumulating so that in time there will be little excuse for exposing workers to unfavorable conditions.

In the vast majority of cases employers are anxious to provide the

best possible conditions for their workers. Like the average human being, they are inclined to conservatism, especially after being induced by loud talking but short performing idealists to undertake an impractical step designed to bring about the millennium in all branches of industrial relations. It is good business to keep workers well and steadily employed. It is poor business to maintain conditions that militate against steady employment. Therefore, there is every inducement for the employer to provide suitable working conditions for those in his employ. In few cases is the employer capable of determining for himself what are the best hygienic conditions to maintain in his factory or workshop. Means are usually at hand or are easily available whereby he can know his hygienic rating. His plant physician can determine for him where his greatest hazards exist, and his engineering department can provide the necessary corrections if they lie in his physical equipment. The correction of the human equipment is the function of the physician.

In the minds of some investigators, the responsibility for all evils of industrial hygiene, as well as their correction, rests with industrial management. This is but a part of the story. The worker has definite responsibilities in these matters often as great or greater than has management. Only moral suasion and threat of discharge can be brought to bear on those who fail to take advantage of sanitary facilities provided for their care.

A fact bearing largely on the worker's fitness and often lost sight of is that he is in the industrial environment but 8 hours daily, the other 16 being at his own disposal unsupervised and uncontrolled as far as his industrial relationships are concerned. The manner in which he spends his extra-industrial time must have considerable influence on his ability to carry on his regular daily work. The domestic environment, recreation habits, and dietary customs of the worker, all affect seriously his industrial capacity and efficiency. "Blue Mondays" are still common in the experience of many employers.

Turning to the entire industrial health field rather than the more restricted area of industrial hygiene, we find many interesting problems awaiting solution. One of the most important is the absorption of the sub-standard worker into the industrial scheme where he will become and remain a productive and contented member of society. By sub-standard is meant the individual subnormal from the standpoint of health as well as the person suffering from personal handicaps. It seems to me that this group is worthy of special consideration, for if its members cannot obtain employment to maintain an

independent existence they must become public charges. For this reason every effort should be made to place such workers where they will not be a danger to themselves, to others, or to property. They should be subjected to a careful examination before employment, not for purposes of rejection but to find out what they can do without injury to themselves or their employers.

When such examinations are made primarily for the purpose of exclusion, without taking into consideration the ability of the one rejected to obtain employment elsewhere, it becomes the prostitution of industrial medical procedures to the financial gain of the employer. Conscientious physicians will not lend their abilities to such undertakings. Many times physical defect is no bar to industrial employment, and when a potential worker is rejected because of some suspicious signs shown by the X-ray in the chest, for example, with no other indications of tuberculosis, or when because of some defect of limb, sight, or hearing, he is denied employment, medical knowledge is used for purposes for which it was never intended. Many handicapped persons are not sufficiently incapacitated to prevent them from rendering useful and efficient service when properly assigned.

If these people are denied employment, to what source can they turn for assistance? Is it any wonder that soap boxes are at a premium in certain quarters for impromptu platforms from which strange and sinister doctrines are preached to the passer-by? How much better would it be if industry made every effort to absorb the useable members of this unfortunate group.

It is true that refusal of employment is often predicated on the penalty imposed by workmen's compensation laws in which the last employer is held liable for the disability resulting from further impairment of function because of injury while in his employ. Many industries would gladly make places for defective workers did not the compensation laws penalize them for so doing. In several states these laws have been amended to take from the employer the extreme penalty for permanent total disability to an already defective worker. In such states there is no barrier to the employment of such persons and many industries are now giving work to those unfortunates formerly denied employment for legal reasons.

It has been the experience of observing physicians in industry that once the sub-standard worker is fitted and adjusted to his work he becomes less a risk than the so-called "normal" individual. The explanation is that the defective worker knows his limitations and will not overstep them, while the normal worker will expose himself to dissipations and excesses of various sorts, and in times of emergency

will subject himself to strains beyond his powers to withstand. It has also been the experience of many physicians in industry that persons who have suffered a disabling sickness, such as tuberculosis, and later returned to work, are usually more careful of their physical welfare than those who have not undergone such experiences.

From these illustrations it is believed that the employment of substandard workers does not carry with it the risks usually thought inherent in such cases, and when we consider further that the employment of this group in some capacity is essential to its existence, it seems only logical that a place be found in industry for its members rather than that their care be forced upon the community.

In the past those employed in factories and workshops have been thought to comprise the large proportion of industrial workers, particularly as far as the health conditions surrounding employment are concerned. In fact, this group, consisting of approximately 12 million workers, is but a small portion of the gainfully employed who comprise more than 42 million people, according to the latest federal census. Other groups are subjected to the hazards of the industrial worker, especially those involving an hygienic or environmental factor. Trade and clerical workers have many problems in common with industrial workers and it would seem that one of the next most logical steps in expanding this work would be a study of the needs of these groups.

Much remains to be known about the chemistry of industrial processes and raw and finished products. New materials and substitution products are constantly being introduced. Their physiological action in many cases is still unknown and deserves careful study and research to determine their possible dangers.

The importance of industrial hygiene is being recognized by an increasing number of scientific organizations as well as by legislative and administrative bodies. Among the more important scientific bodies taking official notice of the industrial medical field may be mentioned the following: American Association of Industrial Physicians and Surgeons, American Medical Association, American College of Surgeons, American Public Health Association, U. S. Public Health Service, American Chemical Society, state and local health departments, state and local organizations of industrial physicians, Conference Board of Physicians in Industry, private health agencies, and university and college research departments.

Among administrative groups are: U. S. Department of Labor, U. S. Bureau of Mines, state departments of labor, state industrial accident boards, International Association of Industrial Accident

Boards and Commissions, American Federation of Labor, American Association for Labor Legislation, Association of Government Labor Officials, American Management Association, National Safety Council, National Industrial Conference Board, trade and manufacturing associations, and life and accident insurance companies.

This incomplete list, covering as it does scientific, governmental, national, state and local groups and organizations of employees and employers, gives some indication of the widespread interest being exhibited in this branch of medical service.

Industrial medical and health service has not yet reached its peak of fulfilment, nor will it do so until all known sources of preventive medicine have been brought into play. We have still far to go in the physical examination of workers and the placing of them only on jobs they are able to carry. A better control over the community life of the worker and his recreation hours away from the workshop must be brought about. This latter responsibility is not that of industry, except in those cases where the industry provides all the available community activities. This control will come largely through the education of the worker to an appreciation of proper health values.

The employer's responsibility and contribution to this work rests largely on the provision of safe and sanitary working conditions. He can also at a minimum of expense make possible the provision of adequate diagnostic facilities for all but the most unusual types of illness and disability, and by this means provide an aid to the private practitioner for the better and more intelligent handling of his cases.

The health officer and the professional health worker enter this field by coöperative efforts in solving and controlling community health problems. Improvement of community sanitation and food supplies, the control of communicable diseases, the education of the worker and his family in matters of health and social welfare, are a few of the more important points of contact between the health officer and the industrial worker and management.

Space does not permit of further elaboration of these subjects. Questions of costs and organization cannot be discussed, except to say that the majority of physicians doing industrial work are not accorded the place in the organization scheme of the companies they serve that their abilities and responsibilities deserve; neither are they receiving a financial return in any way commensurate with their responsibilities. As a result, industry is getting just what it is willing to pay for, no more and no less.

While many problems in industrial hygiene have been solved, many more await solution. As industrial processes change, new factors

influencing the health of workers will be introduced. Secretary of Labor Davis said in his Labor Day speech that the working man would continue to work fewer hours, with more added to his leisure time. After having completed a survey of all federal and state prisons and adult reformatories, I am of the opinion that in many cases there is already too much leisure for certain classes. This changing condition has brought about problems of health and social welfare, and others will arise as the mechanization of industry continues, until all need for workers will have been overcome, and industry and other measures for human existence will be controlled by robots. There will then be nothing to do!

If I mistake not, industrial development has left its mark on our physical, mental and social makeup. Human beings as biological entities change very slowly. Hundreds and thousands of years are required for alterations of mind and body to become evident. With industry the whole scheme of activity changes literally over night. Greater changes have come about in the industrial world in the last fifty years than in the previous historical era. Not so with mankind. His biological changes during that time have been few. He is the same biological being today that he was five thousand years ago, and aside from being confused by attempts to make an adjustment to present conditions there has been no possible change in him during the last fifty years. Today he finds it an extremely difficult matter to adjust himself to the changed conditions created by the industrial environment in which he lives. His efforts to keep up with himself in the fields of labor, amusement, transportation and social customs, place a terrific strain on his mental and physical capacities.

Is it any wonder that so many succumb to the strain and fill our prisons and hospitals for the mentally diseased. Without wishing to be pessimistic, I can see only an increase in the population of these institutions until such a time as sobering influences are exerted over vast numbers of people now enjoying the freedom—so-called—which their new environment permits.

The threat of leisure is no idle one to our advancing civilization. Rightly used it can be the greatest force in the world today; wrongly used it becomes the greatest menace to our social and political institutions. Education offers the best solution to this problem, but it is a slow process. The education of the worker in matters pertaining to his physical health and social welfare offers the best hope of a satisfactory solution of the industrial hygiene problem. It will be slow work but if well done will not have to be repeated. Workers must be taught how to live as well as how to make a living.

Tabulation of Maternal Deaths, and of Causes of Stillbirths and Deaths of Very Young Infants*

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THE underlying object for compiling vital statistics should be as an aid in the protection and permanency of the community. It is important that the data shall show or indicate the essential factors in the clearest manner. The tabulations are not intended for the purpose of satisfying an idle curiosity, and the state is justified in spending time and money in these compilations in exact proportion to the usefulness of the facts set forth.

It may be questioned whether methods now in vogue are always defensible. Is not a change demanded in some of those methods?

PUERPERAL DEATHS

Take for example the matter of tabulating maternal deaths. At present it is customary to compute the rate according to the number of living births recorded. In states which do not have a stillbirth form of certificate such cases are reported both as births and deaths. To tabulate according to live births it is necessary to separate the live births from stillbirths by inspecting the death certificates. This involves extra labor, and it is suspected that sometimes the published rates in such jurisdictions are made according to total births recorded.

In Pennsylvania it is required that stillbirths be reported both as births and as deaths, and we are informed that (*Vital Statistics Bulletin*, Aug., 1929) "they are classified, statistically at least, both as births and deaths"; yet in 15 per cent of the cases no birth certificate has been filed.

The real question is the risk of maternity, and the present method does not give the answer with the accuracy possible for two reasons:

First, there is a confusion of data. Although the divisor represents the number of living births, the dividend includes a large proportion of cases in which there was no living birth.

* Read before the Vital Statistics Section of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 3, 1929.

TABLE I

MATERNAL DEATH RATES (CLASS VIII)

		1926	1927	1928
Birth Registration Area of Continental United States	Births	1,856,068	2,137,836	
	Stillbirths (Varying minimum period)	70,716	82,931	
	Total Births & Stillbirths	1,926,784	2,220,767	
	Maternal Deaths (Class VIII)	12,168	13,837	
	Rates: Per 1,000 Births	6.55	6.47	
	Per 1,000 Births & Stillbirths	6.31	6.23	
Canada	Births	232,750	234,188	236,194
	Stillbirths (Period not stated)	4,064	7,336	7,588
	Total Births & Stillbirths	236,814	241,524	243,782
	Maternal Deaths (Class VIII)	1,317	1,300	1,325
	Rates: Per 1,000 Births	5.65	5.55	5.60
	Per 1,000 Births & Stillbirths	5.56	5.38	5.43
Illinois	Births	137,886*	133,662 *	129,668
	Stillbirths (After 4 mos. gestation)	4,897	4,701	4,678
	Total Births & Stillbirths	142,785*	138,363	134,346
	Maternal Deaths (Class VIII)	498	717	694
	Rates: Per 1,000 Births	3.61	5.36	5.35
	Per 1,000 Births & Stillbirths	3.48	5.18	5.18
New Jersey	Births	72,402	72,814	
	Stillbirths (All periods)	2,953	3,012	
	Total Births & Stillbirths	75,355	75,826	
	Maternal Deaths (Class VIII)	417	456	
	Rates: Per 1,000 Births	5.75	6.26	
	Per 1,000 Births & Stillbirths	5.53	6.01	
Washington	Births	23,989	23,315	
	Stillbirths (After 7 months)	719	650	
	Total Births & Stillbirths	24,708	23,965	
	Maternal Deaths (Class VIII)	180	155	
	Rates: Per 1,000 Births	7.50	6.64	
	Per 1,000 Births & Stillbirths	7.28	6.46	

* Including delayed reports to Aug. 1, 1928.

Puerperal deaths are those tabulated under International Code Class VIII, numbers 143 to 150 inclusive. Practically no death included under cause No. 143—"Accidents of Pregnancy," is connected with a living birth, and a large proportion do not represent any birth. Deaths from puerperal eclampsia frequently result before any birth occurs, and when children are born, many of them are born dead. Deaths from puerperal septicemia frequently do not represent cases of living birth, and a goodly proportion of other deaths in Class VIII are associated with stillbirths.

In a recent field study of maternal deaths in Michigan it was found that, of 819 maternal deaths studied, in 318 cases only were there live births. In 163 there were stillbirths, while in 336 pregnancies there was no issue.

Second, the present divisor is not the best obtainable. In the early days of vital statistics, when stillbirths were seldom recorded, the present method was excusable. Today in the United States and Canada stillbirth reports are legally required. The best obtainable divisor would now seem to be the total number of births recorded, both living and dead.

Table I gives the number of births, stillbirths, maternal deaths, and maternal death rates for 1926 and 1927, in the birth registration area of the United States, with the same data for the states of New Jersey and Washington, from the reports of the U. S. Bureau of the Census*; also similar data for Canada and the state of Illinois for 1926, 1927 and 1928.

Unfortunately there is a great diversity in stillbirth registration. In New Jersey all stillbirths of every period of gestation are reportable, but in the state of Washington a stillbirth report is not required for a stillborn child that has not passed the 7th month of uterogestation.

If, therefore, the maternal death rate is computed according to the number of births plus stillbirths reported, that rate would be abnormally high for a state which records only stillbirths during the 8th and 9th months of pregnancy. Other things being equal, the maternal death rate would be low for a state like New Jersey.

It follows that with every table relating to stillbirths there should be some indication as to the minimum period of gestation.

Physicians are sometimes slow in making records of births. The data for Illinois for 1926 include belated birth reports. The effect upon the maternal death rate as compared with the following years is striking.

If the present divisor of number of live births only is to be retained, justice demands that all deaths not associated with live births be eliminated from the dividend. This would introduce a new element of uncertainty, as in case of plural births, one dead and one live; the maternal death might perhaps properly be chargeable to the stillbirth, though it was associated with a live birth.

The true estimate of the risks of maternity must be found in using as the divisor the total number of pregnancies. This is not generally

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* I wish to acknowledge the kindness of Dr. T. F. Murphy of the U. S. Bureau of the Census in furnishing advance data for 1927.

possible. A good divisor would be the number of confinements. Using data given in the "Preliminary Report" for the Dominion of Canada for February, 1929, the maternal death rates are as follows:

Per 1,000 Live Births	5.78
Per 1,000 Confinements	5.65
Per 1,000 Live and Dead Births	5.58

Unfortunately the number of confinements is not easily obtainable in published reports. It involves clerical work which many offices are not able to give on account of limited office forces. The next choice would be to use the total of live births and stillbirths, plus all deaths recorded for Class VIII in which no birth has been recorded. This seems hardly practicable. Practically, today the best divisor for this purpose is therefore the total number of living births, plus all stillbirths.

INFANT DEATHS

In the *Pennsylvania Vital Statistics Bulletin* for June, 1929, it is said, speaking of "old age":

> The acts of man are traditionally in seven ages, but it is the privilege of the statistician to reduce the number to five, as in the series of articles of which this is the last. In each age, mortality as well as personality presents characteristic features. In infancy the chief causes of death are premature birth, congenital debility and malformations, and certain acute infections which are more dangerous to the very young than to older persons.

In point of fact there seems to be a great deal more difference in the causation of deaths of infants under 1 week of age, as compared with those of 1 month to 1 year of age, than there is between the latter class and children of school age. Infant deaths should therefore be divided into two classes, making a total of six ages instead of five, as referred to above.

In the study of the deaths of very young infants, is the present statistical usage satisfactory—particularly considering the deaths of infants under 1 week of age? It is customary to tabulate according to prematurity, difficulty of birth, defective development, and conditions associated closely with the change from the existence of fetus to that of child. But, do these records really show the true causation of the deaths? Why is a child prematurely born? Why is there a defect of development?

It will be noticed that very frequently the death certificate of the new-born infant gives a record of maternal uremia, of maternal tuberculosis, or maternal syphilis, or other diseased condition of the mother. The true cause of death is the condition which produces the

premature birth, the difficulty of birth, or the defect of development. The same is true relative to stillbirths. There is no present code which enables the statistician to tabulate these early deaths and stillbirths according to the underlying causation.

STILLBIRTHS

It is a custom in tabulating stillbirth statistics to separate urban and rural districts for comparison; to show the number of stillbirths according to months of occurrence; according to legitimacy; according to the age of the mother; according to the nativity of the mother; in comparison with the number of live births; and also according to cause of stillbirth. Most of these tabulations are as yet of little practical utility because they are not correlated with the underlying causes. The Canadian tabulation does not give the information as to cause of stillbirth.

It will be noted that the causation of stillbirths and deaths of very young infants may be divided into three general classes:

1. Maternal diseased condition
2. Conditions either of maternal formation, or maladjustment of the child causing difficulty of birth
3. Diseased condition of the child apparently not dependent upon the maternal disease

For the purposes of study, in order to prevent stillbirths and deaths of very young infants, it seems therefore advisable that the U. S. Bureau of the Census be asked to devise a special code or scheme for tabulating these deaths according to real causation.

What is here suggested is not that deaths of infants during the first week after birth be omitted from, or classified differently in, the general mortality tables, nor the infant mortality tables; but that a special tabulation be made to include these deaths with stillbirths.

Apparently, the approved form of stillbirth certificate should be changed in order to bring out the necessary facts. It should show distinctly what, if any, diseased condition of the mother was present immediately before the birth of the child; and what, if any, operative measures were used. It should show whether or not during pregnancy the mother had had any illness or injury. If difficulty of birth existed, the certificate should show clearly the nature of that difficulty. The certificate should also show if the child had probably died before labor began, or died during birth. These questions might be printed on the back of the certificate, giving ample space for full information. Similar questions might be added to the back of the certificate of death, with instructions that they be answered when the certificate is for an infant less than 1 week old.

Milk-Borne Septic Sore Throat and Scarlet Fever*

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THE first milk-borne outbreaks of scarlet fever reported in this country occurred in New York and Vermont in 1893.[1] Through 1928, eighty-seven milk-borne outbreaks of scarlet fever, and forty-five of septic sore throat have been recorded in the United States.[2-4] No doubt other unrecorded outbreaks have occurred.

The eighty-seven outbreaks of scarlet fever caused 8,368 cases with 39 deaths (data incomplete). The forty-five outbreaks of septic sore throat caused 22,431 cases with 187 deaths (data incomplete). These figures give fatality rates of 0.5 for scarlet fever and 0.8 for septic sore throat. The geographic distribution of these reported outbreaks is given in Table I.

TABLE I

GEOGRAPHIC DISTRIBUTION OF OUTBREAKS

State	Scarlet Fever	Septic Sore Throat
Massachusetts	25	21
New York	20	7
New Jersey	9	—
Connecticut	5	4
Michigan	5	—
Illinois	4	4
Ohio	4	1
Wisconsin	3	2
Montana	3	—
Vermont	2	2
Pennsylvania	2	1
District of Columbia	2	—
Minnesota	2	—
Rhode Island	1	—
Maryland	—	1
New Hampshire	—	1
Oregon	—	1
Total	87	45

Of the sixty-six outbreaks of scarlet fever in which the month of onset was known, 70 per cent, or about three-fourths, occurred from

*Read at a Joint Session of the Health Officers and Epidemiology Sections of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 2, 1929.

December to May, inclusive. Seventy-three per cent of the septic sore throat outbreaks for which this information is known occurred during the same interval (see Table II).

TABLE II

MONTH OF ONSET

Month	Scarlet Fever	Septic Sore Throat
January	9	4
February	7	8
March	2	2
April	11	8
May	10	6
June	2	3
July	6	5
August	4	2
September	2	2
October	3	1
November	3	—
December	7	1
Unknown	21	3
Total	87	45

Table III shows the probable source of infection in those epidemics in which this fact was stated. Of the fifty-six scarlet fever outbreaks, 82 per cent were said to be due to a milk handler, and 2 per cent to a diseased cow and a milk handler. Of the thirty-three septic sore throat outbreaks, 55 per cent were said to be due to a milk handler, and 30 per cent to a diseased cow and a milk handler.

TABLE III

POSSIBLE SOURCE OF INFECTION

	Scarlet Fever		Septic Sore Throat	
Possible source of infection	No. of Epidemics	Per cent	No. of Epidemics	Per cent
Diseased cow	1	2	5	15
Milk handler	46	82	18	55
Diseased cow and milk handler	1	2	10	30
Others (milking utensils, etc.)	8	14	—	—
Total	56	100	33	100
Source of infection unknown	31		12	

Table IV shows certain facts having to do with two outbreaks of septic sore throat and one of scarlet fever, all of which occurred in Massachusetts during the last two years. Note how alike the two epidemics of septic sore throat were in the average number of cases per family, the attack rate, the number of cases per 100 quarts of milk sold daily, and the percentage of cases age 15 or over. In over 1,500 cases of endemic septic sore throat reported in Massachusetts from 1918 through 1928, 59 per cent were age 15 or over, a difference

TABLE IV

FACTS CONCERNING OUTBREAKS

	Septic Sore Throat		Scarlet Fever
	Lee	Charlton	Plymouth
No. of cases on one milk route	565	84	101
No. of deaths on one milk route	38	2	Unknown
No. of families on milk route	244	44 *	250 †
Total "customer" population	1,249	195	Unknown
Source of infection	Cow	Man	Man & (Cow)
Average cases per family	2.3	1.9	0.4
Attack rate	45	43	9.6 ‡
Cases per 100 quarts of milk sold daily	81	84	40
Percentage of cases age 15 and over	78	79	43

* Total of 49 families involved but information on 44 only
† 115 visited
‡ 36 cases among 374 people in 115 families visited

of 19 per cent from the figures given in Table IV, which is statistically significant.

Godfrey in his study "Age Distribution in Milk-Borne Outbreaks of Scarlet Fever and Diphtheria,"[8] reported an unusual proportion of adult cases in milk-borne outbreaks of these diseases. This type of age distribution apparently holds for outbreaks of septic sore throat. In the Plymouth outbreak of scarlet fever there was an unusual proportion of adult cases, 43 per cent age 15 or over, compared with 16 per cent of all cases of scarlet fever reported in Massachusetts from 1923 through 1927.

Dr. Knowlton[9] of Connecticut reported a milk-borne outbreak of scarlet fever in Bristol in which "92 cases occurred among users of milk from one supply amounting to 270 quarts per day." This gives a rate of 34 cases per 100 quarts of milk sold daily, which is practically the same found in the Plymouth outbreak. The number of cases per 100 quarts of milk sold daily is a very rough figure, but it is worth noticing that the rates were about the same in the two outbreaks of each disease, and were different for septic sore throat and scarlet fever.

DISCUSSION

The Lee outbreak was without question septic sore throat. The *Streptococcus epidemicus* was isolated repeatedly from the udder of the infected cow and the same organism, identical in its cultural characteristics, from the throats of several patients and the blood of one. The clinical,[7] epidemiological,[8] and bacteriological[9] studies already published portray a perfect picture, marred only by lack of proof that a human being infected the cow.

While the Charlton[10] outbreak was clinically septic sore throat, the disease was much milder than in Lee, with few complications.

There were 2 deaths. Physical examination of the 8 cows in the herd showed, according to the veterinarian, a healed mastitis in the right rear quarter of 1 cow. Three bacteriological examinations of milk from this quarter failed to reveal infection. Four separate bacteriological examinations of the milk from each of the other cows by two different laboratories likewise were negative. The first cases—6—were reported to us on June 25. Investigation showed that 84 cases had occurred with onsets as shown in Table V.

TABLE V

SEPTIC SORE THROAT, CHARLTON—DATE OF ONSET OF CASES

Date	Number	Date	Number
June 14	2	June 21	8
15	3	22	6
16	6	23	9
17	12	24	4
18	8	25	2
19	5	Unknown	1
20	18		
	Total		84

Eighty-three of these had their onsets in a period of 12 days between June 14 and June 25. In 1 case the actual date of onset was unknown. Infection of the milk probably occurred at least 48 hours prior to June 14, and at intervals during the following 10 days.

The source of the infection was the dairyman and his family. Late in February or early in March the daughter, age 17, had an unreported case of scarlet fever. On March 30 the son, 15, had his onset, was hospitalized on April 3, and discharged and sent home as a "clean" case with throat cultures negative for hemolytic streptococci May 22. Soon after the son's return to the farm the father developed a sore throat, and his wife said he had a generalized rash. He was not seen by a physician at this time. The father alone cared for the cows, which were milked by machine but "stripped" by hand. All the milking utensils were washed in the household and not steamed. The milk was bottled and capped by hand.

The father continued to work during his illness and until Sunday, June 16. He attended to the production, handling and distribution of the milk on this morning, but went to bed in the afternoon with a sore throat which had been troubling him for some 10 days or more. He was hospitalized June 21 and died June 24 of a general streptococcic septicemia.

From June 16 to June 21 this man was cared for at home by his wife and daughter, one or both of whom washed the milking utensils, which were not steamed. In addition, the mother developed a septic

finger which was opened on June 18. On June 19, the customers were advised by the dairyman to boil their milk, but the milk was not shut off until June 21. Cultures from the blood of the dairyman and from the throats of three patients were hemolytic streptococci of the beta type, but did not have the special characteristics of epidemicus. The strain did produce a Dick toxin about one-tenth as potent as the Hygienic Laboratory standard.

The Plymouth[11] outbreak was first called to our attention on March 7, when the department was asked to investigate the possibility of a milk-borne outbreak of scarlet fever.

Investigation showed that 101 cases of scarlet fever occurred on the milk route of dealer W, and 26 on the milk routes of thirteen other dealers in the community. Of these 26 cases, 22 were shown to be due to contact, and in 4 the source of infection was undetermined.

During January and February, Plymouth reported 7 and 13 cases of scarlet fever, respectively. The January and February incidence in 1929 was about twice the average incidence for the same months for the last 5 years.

Table VI shows the dates of onset of the 127 cases occurring between March 3 and March 31 on the route of dealer W, and thirteen other dealers.

Ninety-five of the 101 cases occurring on the milk route of dealer

TABLE VI

PLYMOUTH OUTBREAK

Date of Onset of Cases with Milk Dealer

Date of Onset	Dealer W	Thirteen Other Dealers	Total
March 3	2	—	2
4	7	1	8
5	14	3	17
6	26	4	30
7	13	2	15
8	11	3	14
9	11	—	11
10	6	1	7
11	5	4	9
12	1	—	1
13	1	—	1
15	1	1	2
16	—	1	1
17	1	1	2
20	1	—	1
22	—	3	3
26	1	—	1
27	—	1	1
31	—	1	1
Total	101	26	127

W came down within a period of 9 days, between March 3 and March 11. The milk was stopped on the morning of March 7, so that infected milk may have been delivered up to that date. The 6 cases occurring from March 12 on were presumably secondary. At least 5 more of the 95 cases under consideration could have been secondary on the epidemiological evidence. The peak of the epidemic occurred on the 4th day. Forty-five per cent of the cases occurred during the first 4 days of the outbreak.

Dealer W delivered about 250 quarts of raw milk a day, of which about 80 were from his own farm, and about 170 purchased from producer B. Investigation of the farm of producer B showed no infection among the milk handlers. Physical examination of the fifteen cows of producer B by veterinarians showed no evidence of garget, nor did bacteriological examination of the milk from these animals show infection. Physical examination by veterinarians of the seven cows of dealer W showed three with garget, one of which was not being milked. Cultures from the milk of the two cows with garget, which were being milked, showed beta hemolytic streptococci of the human type. One of the milk handlers of this dealer had a suspicious looking throat, a culture from which showed hemolytic streptococci of the beta type. This milk handler had a history of having had grippe some 6 weeks before. No history of scarlet fever could be obtained from him or his family. Careful examination of this family group failed to show any desquamation.

Thus, the only evidence that a human being might have infected the two cows in the herd of dealer W is that one of the milk handlers with an illness some 6 weeks before, which was diagnosed as "grippe," had a suspicious looking throat with a culture positive for hemolytic streptococci of the same type as those isolated from the udders of the two cows. When and how the infection of the cows took place is problematical.

Cultures from the milk handler, the milk of the two infected cows, and from cases of scarlet fever were sent to two different laboratories. One laboratory reported only on the cultures from the two cows. One strain showed the characteristics, cultural and immunological, of the epidemicus type, while the cultures from the other cow showed the characteristics of the scarlet fever strain. The second laboratory reported the isolation of the epidemicus type from the two cows and from nine individuals. Eight strains from individuals differed from the epidemicus type in that they showed no capsule; produced small zones of hemolysis; and showed a slight tendency to cloud the broth. In three instances both types were found in the same individual. It

was suggested that these two types of streptococci represent the smooth and rough types of the same hemolytic streptococcus.

It is our opinion that the present weight of evidence shows that milk-borne outbreaks of septic sore throat and of scarlet fever are generally the result of an infection of one or more cows by an individual carrying hemolytic streptococci of the human type. As a result of this the milk is already infected when it leaves the cow and the outbreak is due to this infection rather than to contamination of milk in the interval between its leaving the cow and its use by the consumer. With these ideas in mind, our recent investigations of these milk-borne outbreaks have been carried out with the aim of finding an infected cow or cows and also of locating the human source of the cow's infection. It is not always possible to locate both the human and the bovine source of infection, and it is almost too much to expect that both of these should be found in every epidemic. Both the person and the cow may show positive cultures for only a brief period, which may well have passed before an investigation is undertaken.

SUMMARY

Eighty-seven milk-borne outbreaks of scarlet fever have been recorded in the United States from 1893 to 1928, and 45 milk-borne outbreaks of septic sore throat 1908–1928.

Fifty-five per cent of all the milk-borne outbreaks of scarlet fever and septic sore throat recorded were in Massachusetts and New York.

About three-quarters of the recorded outbreaks of both diseases had their onsets between December and May.

In 82 per cent of the outbreaks of scarlet fever a milk handler was the probable source of infection, as compared to 55 per cent of the outbreaks of septic sore throat.

In certain milk-borne outbreaks of both scarlet fever and septic sore throat in Massachusetts there was an unusual proportion of cases age 15 and over.

In the Lee outbreak of septic sore throat a cow was found to be infected with a *Streptococcus epidemicus*.

In the Charlton outbreak (clinically septic sore throat) the source of infection was the dairyman or his family, all of whom had scarlet fever except the mother, who had a septic finger. No infected cow was found.

In the Plymouth outbreak of scarlet fever the probable source of infection was a milk handler. Two cows were found to be infected.

The bacteriological evidence showed conclusively that the Lee outbreak was caused by a streptococcus of the epidemicus type. Studies of organisms from the throats of patients in the Charlton outbreak showed them to be definitely not of the epidemicus strain, but closely related to the scarlatiniform strain.

Cultures from the Plymouth outbreak of scarlet fever, on the other hand, were reported of both the epidemicus and scarlatiniform types.

REFERENCES

1. Trask, John W. *Bull. Hygienic Lab. No. 56*, Mar., 1909.
2. Armstrong and Parran. Supplement *Pub. Health Rep. No. 62*, 1927.

3. White, Benjamin. Epidemic Septic Sore Throat, Historical Review, *New England J. Med.*, 200, 16 (Apr. 18), 1929.
4. Crumbine, S. J. Personal Communication.
5. Godfrey, Edward S., Jr. Age Distribution in Milk-Borne Outbreaks of Scarlet Fever and Diphtheria, *A. J. P. H.*, XI, 3: 257 (Mar.), 1929.
6. Knowlton, Millard. Milk-Borne Scarlet Fever in Connecticut. To be published in *Annual Report*, Connecticut Department of Health, 1929.
7. Holmes, May Salona. A Clinical Study of the 1928 Epidemic in Massachusetts, *New England J. Med.*, 200, 16 (Apr. 18), 1929.
8. Lombard, H. L. Septic Sore Throat in 1928 in Massachusetts: Epidemiology, *J. Prev. Med.*, 3, 2 (Mar.), 1929.
9. Robinson, E. S., and Beckler, E. A. Bacteriological Study of Hemolytic Streptococci from a Massachusetts Outbreak of Septic Sore Throat in 1928, *J. Prev. Med.*, May, 1929.
10. Massachusetts Department of Public Health. Unpublished data.
11. Forsbeck, Filip C. An Outbreak of Scarlet Fever Traced to Milk. Unpublished paper.

DISCUSSION

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IN his excellent paper Dr. Scamman has listed 132 milk-borne outbreaks of scarlet fever and septic sore throat that have been reported in this country during the past 35 years. These outbreaks were reported from northern states. None came from further south than Maryland and the District of Columbia. Those states in the South, which, according to a recent editorial in the JOURNAL, have assumed leadership in public health, have not contributed a single outbreak to the list. Does this represent a difference in the alertness of health officials, a difference in susceptibility to the streptococcus, or a difference in milk consumption in the two sections of the country?

That three-fourths of these outbreaks should occur from December to May is not surprising. Scarlet fever is more prevalent at this time. A similar seasonal variation may be expected in the case of other streptococcus infections.

Dr. Scamman's figures show that septic sore throat has an attack rate over four times that of scarlet fever; that it attacks nearly two and one-half times the number of persons per 100 quarts of milk distributed; and that nearly double the per cent of cases are over 15 years of age. Why? Scarlet fever is more readily spread by contact. More people are immune to scarlet fever, especially in the higher age groups. Fewer susceptibles—fewer cases! Do you agree? Or, does septic sore throat fail to confer immunity?

The Charlton outbreak of septic sore throat followed the occurrence of scarlet fever in the dairyman's family. On the assumption that any well behaved streptococcus will breed true to type, I suppose we may be justified in the view that scarlet fever had nothing to do with septic sore throat. Yet, how do we know that *Streptococcus epidemicus* is not a mutation form of *Streptococcus scarlatina?* This question appears pertinent also in connection with the Plymouth outbreak of scarlet fever where two types of streptococcus were isolated. Are *Streptococcus epidemicus* and *Streptococcus scarlatina* mutation forms of the same parent stock? Are these two microbes really, as one laboratory suggests, the smooth and rough types of the same organism? With *Streptococcus epidemicus* present in the outbreak, why did only scarlet fever cases occur?

Perhaps those of us who know nothing about the intricacies of laboratory procedure in dealing with the elusive streptococcus may be pardoned for asking ques-

tions. The practical application of epidemiology to the prevention of disease requires the translation of laboratory reports into administrative procedure. Some of us who must face these problems in our daily work would like very much to know just what is meant by *Streptococcus epidemicus*. We would be immensely pleased if the laboratory worker could inform us definitely and infallibly which streptococci are pathogenic for humans and which are not. Unfortunately, we are not quite sure about the matter at the present time. We are optimistic, however, and hope that some day we may know something about the streptococcus.

Because of its relation to procedure for disease prevention, perhaps the most important point emphasized by Dr. Scamman is that types of streptococcus pathogenic for man may also be pathogenic for the cow. Jones found in 1927 that cows may become infected with the scarlet fever streptococcus. This was confirmed by our experience in Connecticut with two milk-borne outbreaks of scarlet fever in January and May, 1928. In each case a cow was found to be infected with a streptococcus which responded to tests for the scarlet fever streptococcus. In each instance strains of streptococcus obtained from the throat of a man working on the farm, from the milk of the infected cow, and from the throats of scarlet fever patients appeared to be identical. One laboratory reported *Streptococcus epidemicus;* others reported what appeared to be *Streptococcus scarlatina*. Further confirmation of the point that the scarlet fever streptococcus may cause pathology in a cow's udder is now afforded by Dr. Scamman's report of the outbreak at Plymouth. The same point with reference to septic sore throat is illustrated by the Lee outbreak.

This is a new point, and its recognition requires a new procedure for the emergency handling of milk-borne outbreaks. As soon as epidemiological evidence justifies a suspicion that milk may be responsible for an outbreak of scarlet fever or septic sore throat, the following steps should be taken:

1. Stop the sale of suspected milk at once unless it can be pasteurized.
2. Advise boiling all suspected milk on hand at the time the milk supply comes under suspicion. Arrange to have this advice reach each customer at the earliest possible moment.
3. Before approving a pasteurization plant for pasteurizing a suspected milk supply, inspect the plant as to type of apparatus, method of operation, accuracy of thermometer used to determine temperature, and such other points as may need attention to make sure that a satisfactory heat treatment of milk handled in the plant will be obtained.
4. Examine all milk handlers by both clinical and laboratory methods, and remove from handling the milk all persons found to be diseased or to be carriers.
5. Examine all cows in the dairy herd by both clinical and laboratory methods and remove from the herd all found to be infected.

These measures should result in prompt control of milk-borne outbreaks. The best way to prevent such outbreaks is to pasteurize all milk.

Greatness

WITH new understanding we have come to realize at last what we might have known long, long ago, had history served us as it should. We have come to know that God's true princes do not always stand god-like and shining, pricked out forever from their fellows. We have come to understand great movements that sway the minds of men from our studying chance writings and sayings of mere anonymous and simple souls.—T. Wingate Todd, *Bull. Acad. Med.*, Cleveland, O.

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THE CORONER'S DILEMMA—FOOD POISONING

RECENT press reports, particularly from Chicago, have called attention to the interesting possibility of poisoning from the mechanical type of refrigerators, presumably from methyl chloride gas. Many of the cases and deaths were at first regarded as food poisoning. Too often does this diagnosis appear in health department records and coroner jury proceedings, without proper and adequate epidemiological, bacteriological and toxicological investigations by the constituted authorities. Geiger and other workers in this field generally recognize two types of food poisoning. One type is due to the contamination of the food with some one of the paratyphoid group, or other bacteria derived from a human or animal carrier, or from the meat of an animal suffering with a specific infection of these germs.

Subsequent incubation of the contaminated food through insufficient cooking, refrigeration or storage allows the bacteria to grow and form a poisonous product, or perhaps in the process of heating, certain products become soluble and evidently poisonous.

The consumption of such food is followed after several hours by nausea, abdominal pain, vomiting, prostration, diarrhea, and perhaps fever. Complete recovery within 48 hours is the rule.

In making investigations for this type of poisoning, one should: (*a*) Always suspect freshly cooked or warmed over foods. Preserved foods are rarely at fault. Foods are apparently normal as to taste, appearance, odor and texture. (*b*) Make bacteriologic examination of excreta of patients and the suspected food for the paratyphoid group and other organisms. Feed mice with suspected food both directly and by stomach tube. (*c*) Make bacteriologic and epidemio-

logic search for human carriers and possible contamination from animal sources.

The other type of food poisoning is known as botulism. It is due to the contamination of the food with a specific germ known as the *Bacillus botulinus*. This is found in the soil practically throughout the world in the spore form, and as such is not poisonous.

When so-called non-acid foods, such as many vegetables, fish and meat, preserved by faulty and unsanitary methods are eaten, botulinus poisoning may occur. The symptoms usually appear within 24 to 48 hours. There may be marked muscular weakness, disturbances of vision, loss of ability to swallow and talk, constipation, rapid pulse and subnormal temperature—rarely any pain. Death occurs from respiratory failure.

In making investigations for this type of poisoning, one should: (*a*) Always suspect preserved foods, and meat products, such as sausages. Spoilage is noted in many instances. (*b*) Test suspected food for toxin by inoculation of mice, guinea pigs or rabbits. Test for type with specific antitoxin. Culture suspected food for the presence of spores, particularly if food has been previously boiled.

X-RAYS AND THE PUBLIC HEALTH

IT is by now an accepted doctrine that the greatest progress in public health is to be made in coöperation rather than in competition with the medical profession. The modern health commissioner seeks not so much to supplement as to reinforce the public health activities of his colleagues in private practice. Why should not this be as true in the field of tuberculosis control as it is, for example, in the control of venereal disease or of diphtheria? For the early diagnosis of these diseases every assistance is given by the state or the municipality. The early diagnosis of tuberculosis is of no less public importance. It is true that public health laboratories will examine and report on sputum; but in view of our present knowledge of tuberculosis we can no longer be satisfied with that as an aid to *early* diagnosis.

As Dr. Gerald B. Webb[1] has boldly stated: "Roentgen examination is the only method available for detecting early pulmonary tuberculosis." How often is this examination made? Certainly not as a "routine roentgen examination of all young adults," which is Dr. Webb's ideal. How often, on the other hand, must the practicing physician hesitate, when he does definitely need the assistance of the X-rays, because he knows that his patient can hardly bear the not inconsiderable cost?

Will not some progressive health department install a radiologist and invite the practitioners of its constituency to send all their patients suspected of tuberculosis and all contacts of active open phthisis for X-ray and expert interpretation whenever the financial status makes it impossible for this aid to be privately obtained?

The existence of public tuberculosis clinics is no more an objection to the giving of such service than is the existence of a venereal disease clinic an objection to the giving of service by laboratory tests and examinations. Moreover the assistance of the physician who is in the front trenches in the war against disease, is of much greater value to the morale of the army than is the occasional and rather haphazard injection of shock troops into the fight.

REFERENCE

1. Webb, Gerald B. The Early Diagnosis and Early Care of Pulmonary Tuberculosis, *J. A. M. A.*, June 1, 1929, p. 1811.

THE NEW ORDER IN HEALTH EDUCATION

ON another page we publish a letter showing the reaction of a worker to his experience on a Chautauqua Circuit which carried him over a large part of the United States in the interests of health. Even if we do not agree entirely with his views, they certainly give us food for thought.

There can be no question that healing and the relief of suffering appeal to the sympathetic, and the general public, more than does the prevention of disease. The average person has not yet learned the meaning of the term "positive health" and all that it carries in the way of joy of living and efficiency.

Nothing is further from our intention than to knock health officers. Their work is fine and indispensable. We believe, however, that they are deficient when it comes to the education of the public. Our present methods are very much like those of the agricultural experiment stations. One station, generally the government, publishes a bulletin on spraying potatoes, for example, and gives photographs of two piles of potatoes, one showing the yield from an acre which has been sprayed, and the other from one not sprayed. The same routine is followed in regard to fertilizers and many other things. Agricultural stations throughout the country perform the same experiment, and similar bulletins are issued, *ad nauseam*. That some good is accomplished no one can deny, but there is a woeful lack of originality, much wasted effort and an enormous waste of printer's ink and paper. One reads of the millions of bulletins which are sent out from Washington,

but no one knows the percentage of these that go into the waste-basket unread.

Do not our health officers follow the same general plan? Do they not use plate matter, and is not the getting out of the bulletin a task which they dread, and in which they take little interest, except for the statistical part, which they use to show the amount of work done?

We do not criticise this method entirely. When something new is brought forward, such as the discovery of the diphtheria antitoxin, the use of toxin-antitoxin, or the danger of undulant fever from unpasteurized milk, the more widely the information is spread, the better for everyone. In spite of this we are compelled to believe that there is a lack of originality in the educational programs of health officers, who are selected not because they are spellbinders or know how to edit a popular magazine, but on account of their knowledge of disease and preventive medicine. Knowledge must be available in order to be of use. It cannot be kept locked up in a strong box if it is to accomplish anything in the world. For this reason our JOURNAL conducts a department of Education and Publicity from which health officers can derive many useful hints in the art of putting things over. We all are in need of education, but the public needs it more than the profession.

The day of mystery, gold-headed canes, dress-suits, high hats and Latin prescriptions in medicine is gone. Distasteful as the truth may be, the medical man and health officer must learn something of the arts of the promoter in order to accomplish the greatest good.

INFANT MORTALITY IN OUR CITIES

WE have become so accustomed to a drop in the infant mortality rate from year to year that for a moment there is just a little pang of disappointment that 1928 was an exception. According to the *Statistical Report of Infant Mortality for 1928 in 729 Cities of the United States,* recently issued by the American Child Health Association, the rate for the cities of the country was 68.3. This represents a slight rise over 1927 when the rate was 64.9. The 1927 rate was the lowest ever attained and any perturbation over the setback in 1928 may be immediately assuaged in the realization that the 1928 rate, even though not quite so good, is still the second best on record.

The rate for "the country" is now coming to be much more significant than formerly. In 1915 "the country" was represented by the records from 10 states and the District of Columbia, which then constituted the Birth Registration Area. In 1928 "the country" was

represented by 44 states and the District of Columbia. The growth in the size of both the Death and the Birth Registration Areas is a matter of extreme satisfaction. One more state with acceptable records, Nevada, was added in 1929 so that now but 3 states, South Dakota, Texas and New Mexico, remain unrepresented in our national vital statistics.

The report, based on provisional figures from the U. S. Bureau of the Census and records from state and local officials, gives 1928 rates for each of 729 cities over 10,000 population in 1920, as well as rates for individual years since 1923. While the figures themselves are believed to be accurate, caution is urged in the interpretation placed on the rates for individual cities. Conscious public health effort is not alone responsible for the magnitude of a rate, but the presence or absence of hospitals and other children's institutions and, in the words of the report, "state of wealth, family customs characteristic of different race and nationality groups, knowledge and probably climate." It is these factors which explain why cities of the west coast and of certain middle western states have the lowest infant mortality rates and have had for years. Whether or not an unfavorable combination of these factors excuses a city for having a high rate is another matter. Eastern and southern cities would be inclined to think that it did.

Even making allowances for unusual local conditions, there is a direct challenge in the fact that where one-sixth of our cities have rates under 50, another sixth have rates over 90. The progress of the recent past is encouraging, but that should not dissuade us from continued efforts in baby life saving. There is every reason to believe that further reductions in the death rate are entirely possible and practicable.

LETTER TO THE EDITOR

To the Editor:

In response to my curiosity while traveling in the mountainous region of Tennessee, a doctor directing a county health department said:

> If you mind your own business you'll find no better people in the world. About two weeks ago I was up in an isolated settlement. One of the mountaineers casually asked about this new medicine that kept away diphtheria. I explained. He said he wanted his children to have it. So I returned in a few days and there were forty children from near and far assembled to receive toxin-antitoxin. The word had passed around. They came.

Why? Is it that the primitive, native intelligence goes straight to the heart of a simple proposition? Is it a confidence in the truth of science unspoiled by suspicions engendered by its ignorant enemies, unspoiled by the patronizing mellifluousness of its friends?

One director of health in what is probably the most progressive of states says the people know too much. They are demanding of the doctors more than the doctors are prepared to give. He says the educational efforts of preventive medicine should be expended on the doctors. Contextually, his meaning is that the information contained in the leaflets and booklets, and which for the most part stays there, should be in the doctor's head, and by his voice conveyed to those who would learn. Passing this by, let us contemplate the avalanche of instruction in disease prevention constantly sweeping down on the populace. Booklets, bulletins, circulars, games, almanacs, press notices, boiler plates, posters, lectures, lantern slides, moving pictures, newspaper advertisements, exhibits, plays, health automobiles, health trains, etc., etc. How much good does it all do? Compare the results with the word of the doctor to the mountaineer.

The spoken word is conceded to be the most valuable means of imparting knowledge. In what way? To an assembled multitude? Possibly our impatience demands great round numbers, but we must remember there aren't many Ciceros or William Jennings Bryans in the medical profession. I have seen Herculean efforts put into so-called publicity for a grand public health rally presided over by medical supermen, rewarded by two or three rows of beautiful nurses, tubbed and starched, and a few doctors' wives and offspring. The nurses of course were detailed for fatigue duty, the graduates were "busy."

What keeps the multitude away? Dryness, no tabasco, not even salt. I, myself, have writhed in agony till I thought the speaker must feel my pain and liven things up a bit or quit. But no! He was enjoying himself.

So rarely does this method work that we might as well give it up. But if the deans and professors of medicine can't attract an audience, or even interest the well-intentioned few, to whom can we turn? To the family physician. If he has the knowledge and the faith he can speak to a man or woman, his own people, in the quiet of his office or the home and they will listen, believe, and do as he says. Then why don't the doctors do it? They have never been told it is part of their work. They have been trained, like the Victorian children, not to speak until spoken to. Public health, many of them believe, is distinct from their life work. They watch the health officer do their work as some railroads watch the auto-buses

carry their passengers. They, themselves, should do preventive medicine as progressive railroads have installed bus lines and increased their business.

The public has grown stale from constant exposure to health instruction. No matter how pretty or charmingly illustrated the educational literature, it can't compete in interest with a Sears, Roebuck catalogue. Would it be possible to declare a 10-year moratorium to the distributors of hit or miss health tracts? And, above all, to silence with a sledge hammer or a rope or poison that hackneyed phrase, "See your doctor," that recurs like the thump of a flat wheel every minute? If so, put the money into a sound, authoritative volume on the prevention of disease for doctors, and insist that they "See your families." Stir up every medical society in the country to give over a sufficient number of meetings to the compelling and insistent fact that modern medicine is passing through a transitional period, a period of reconstruction; that its most valuable function is prevention; that today treatment and cure, though necessary, are secondary and more or less emergency measures—and then have demonstrations in the practice of preventive medicine.

The ideal of medicine will not be reached until the doctor becomes primarily the teacher, weaving his teaching into his daily rounds, and not be, as at present, merely subjected about once a year to a bout of *paralysis agitans* as he wanders all over the domain of health before a luncheon club. His patients and friends will expect him to tell them what scientific medicine can do to keep them well, and expect him to administer it. The sound basis of modern dentistry is prophylaxis; it is an inspirational guidepost to general medicine. When the health clients of the doctor are watched and cared for through the successive periods of life, immunized at the proper time against contagious diseases, given physical examinations at regular periods and thus saved money, time, distress and heartaches, the doctor can look the world in the face because he is doing his full duty.

If the doctor will abandon the vain gesture of old King Canute and realize that preventive medicine offers greater victories over disease than curative medicine through all the centuries, it will be but a short time until official health authorities will be only administrators, guard the water and milk supplies, look after the sewage disposal, keep the statistical records, and act as a clearing house of information as to the trend of health and disease.

JOSEPH P. KANE, M.D.

ASSOCIATION NEWS

Executive Board Meeting

The first meeting of the new Executive Board since the Annual Meeting was held in New York on November 16 and 17. The principal business at this meeting of the Board was consideration of the organization of the activities of the Association under the terms of the new By-laws adopted at Minneapolis. The responsibilities of the four standing committees created by these By-laws were discussed at length and consideration given to personnel for appointment to these committees. These appointments when made will be announced in the JOURNAL.

A delegation of health officers from New Jersey waited on the Board to urge the continuance of *The Health Education Service,* pointing out that in their communities it had proved to be a most valuable asset in promoting the work of the health department. The Board referred the matter to the new Committee on Meetings and Publications, and, pending a review of the situation by this committee, authorized the continuation of the "Bulletin" to July, 1930.

The relation of the committees of the Association and its sections to the new plan of organization was discussed and decision on these matters deferred until the appointment of the new committees and their report to the Board.

Dates for the Fort Worth meeting were tentatively selected for the week of October 20 or the week of October 27, final decision to be made so that conflict will be avoided with annual meetings of other societies of interest to the Association members.

The next meeting of the Board will be held on December 6, together with the chairmen of the four standing committees.

HEALTH CONSERVATION CONTEST

Eighty-four cities representing 33 states, Hawaii, and the District of Columbia, are now officially entered in the Health Conservation Contest which opened June 20, 1929.

The Chamber of Commerce of the United States is conducting this contest to further development of national health interest. Other agencies interested in health work and realizing the immense value of the Health Conservation Contest, are urging active support of this nation-wide movement.

The purpose of this contest is to reduce economic losses due to unnecessary illness and death and to promote a constructive health program. The layman and the professional are working together enthusiastically with this aim in view.

The period of this year's competition ends on January 1, 1929. Awards for the winning cities will be made at the next annual meeting of the Chamber of Commerce of the United States. In order that the contest may be as fair as possible, a city will compete only with cities of its population class. A fact-finding schedule, dealing with the fundamental items of a community health program, has been sent to all con-

testants. A committee of health experts will grade the cities enrolled on the basis of this schedule.

The field staff of the Committee on Administrative Practice is in a position to give a limited amount of consultant service to those cities in the contest. This service is rendered without charge upon the invitation of the health officer. Fifteen cities have already taken advantage of this offer and have declared it extremely helpful in analyzing local problems and in formulating programs.

MERRILL E. CHAMPION RESIGNS

The Journal regrets to announce the resignation of Dr. Merrill E. Champion as editor of the Child Hygiene Section notes. Dr. Champion has been a contributor to this department since the resignation of Dr. Taliaferro Clark in March, 1926.

Dr. Champion is now handling child health demonstrations for the Children's Fund of Michigan in Detroit, and finds it impossible to continue the JOURNAL work.

NEW MEMBERS

Grace Abbott, A.M., Ph.B., Washington, D. C., Chief, U. S. Children's Bureau

M. Ciuca, M.D., Iassy, Roumania, Professor of Hygiene, University of Iassy (Assoc.)

Prescott A. Creelman, M.D., Charlottetown, P. E. I., Chief Health Officer

J. George Dempsey, M.D., New Orleans, La., Registrar, Vital Statistics, State Board of Health

Laura A. Draper, B.A., B.S., Medford, Mass., Assistant Director, Boston Community Health Association

Joyce Ely, Ruskin, Fla., Staff Nurse, State Board of Health

Glenn S. Everts, M.D., Philadelphia, Pa., Medical Secretary, Philadelphia Health Council and Tuberculosis Committee

Elton M. Hilton, B.S., Yosemite National Park, Calif., Sanitary Inspector, National Park Service

Elisabeth Hixon, R.N., Marianna, Fla., Staff Nurse, Bureau of Child Hygiene and Public Health Nursing, State Board of Health

George W. Hug, Salem, Ore., Instructor in Health Education, University of Oregon

Howard B. Iglehart, Seguin, Tex., Public Health Engineer, City Board of Health

Paul E. Laird, B.S., M.A., Durant, Okla., Department of Health, State Teachers College

John B. McCreary, M.D., Harrisburg, Pa., Deputy Secretary of Health, State Department of Health

Sarah McGiffert, Chicago, Ill., In charge of Health Education in City Schools

Thomas D. Maher, M.D., San Francisco, Calif., Director, Child Hygiene, City Board of Health

Benjamin F. Matheny, Clarksburg, W. Va., City Health Officer

Florence C. Owen, R.N., De Kalb, Ill., School Nurse and County Supervisor of Child Hygiene

Roe E. Remington, Ph.D., Charleston, S. C., Professor of Nutrition; Director of Food Research, State Medical College

George L. Robinson, C.E., New York, N. Y., Design and Construction of Sewage Disposal Plants and Water Supply

Joseph A. Sauls, Jr., Houston, Tex., Engineer and Director of Sanitation of Water Supply, City Board of Health

Samuel W. Tay, B.S., Honolulu, T. H., Director, Bureau of Sanitation, Territorial Board of Health

Clara T. Warne, R.N., Los Angeles, Calif., Official Organizer of Birth Control Clinics in the State

Elizabeth A. Woodworth, M.D., Minneapolis, Minn., Bacteriologist

Dorothy Worthington, M.D., A.B., White Plains, N. Y., School Physician

Dorothy E. Wright, R.N., Jersey City, N. J., Instructor in Health Education, State Normal School

Dr. Wu, Lien Teh, Director, Manchuria Plague Prevention Service, Harbin, China (Assoc.)

PUBLIC HEALTH ADMINISTRATION

HENRY F. VAUGHAN, D. P. H.

PREPARATION OF ANNUAL REPORT

W. H. ENNEIS, M. D.

Deputy Health Officer, Knoxville, Tenn.

FOR four successive years the Knoxville Bureau of Health has mimeographed its *Annual Report*, containing on an average 100 pages, about three-fourths of which contain tables, charts and graphs. Everything in it is mimeographed, even the covers which carry a coat-of-arms and appropriate lettering.

On two occasions the material was submitted for an estimate of the cost of printing, and each time the price exceeded the amount available for this work. This condition is largely due to the charges for the reproduction of graphs, maps and charts. Two hundred and fifty copies of the 1928 report containing 89 pages were produced at a cost of 38½ cents each. These costs are itemized as follows:

Paper—pen point mimeograph (25,000 sheets)	$50.00
Stencils—108	18.00
Ink—2 lbs.	10.00
Covers	4.50
Cost of binding	13.75
Total	96.25

Labor is not included in the above figures since the work was done altogether by regular employees over a period of several weeks. During the winter of each year a number of days are so inclement as to interfere seriously with active field work of the sanitary inspectors. This time has been partly utilized by having these men operate the mimeograph machine and assemble pages, as well as do other work incident to the preparation of the report.

At the end of the calendar year practically all necessary statistical data are available for the year, as monthly progress reports are made of all activities of the bureau. The chief difficulty lies in assembling this material into graphic, tabular and narrative form for illustrative purposes.

All stencils requiring the use of the typewriter are cut by one typist who is selected because of her skill and experience with that particular kind of work. Such practice minimizes repetition and waste of material and insures a certain degree of uniformity. The person who cuts stencils for graphs and charts must have some knack for draughtsmanship.

All stencils are preserved so that during the year the material may be used in a weekly letter to physicians and as other enclosures. They are also used in lectures to classes in sanitation and in public health nursing.

For those health organizations desiring large numbers of reports for distribution, the cost of printing would certainly be less than mimeographing. To produce more than 250 copies by the mimeograph method would be burdensome and impractical. However, the experience of this bureau has been that this number of reports or less can be produced at a very reasonable price within our own organization.

AN EXPERIMENT IN MEASLES CONTROL

JOHN P. KOEHLER, M. D.

Commissioner of Health, Milwaukee, Wis.

DURING the first 6 months of 1929 there were 12,949 cases of measles reported to the Milwaukee Health Department. The epidemic reached its height on May 17 when there were 2,230 cases on hand. As usual, most of the cases were among preschool children and those in the kindergarten and lower grades.

When measles becomes epidemic in a school, very few susceptibles escape. Many parents appealed to the Health Department to close the schools. Not feeling justified in doing this, the Health Department decided to try a procedure that would make it possible for children who had never had measles to remain at home. It was decided that every schoolroom that had 10 per cent or more of its children absent on account of measles be ordered closed. Only cases that were reported during a period of a week were counted. The children attending these infected rooms were not sent home until the close of school at noon or in the afternoon. This was done to avoid any unusual disturbance in school. An exclusion slip was handed to every pupil, informing parents that he was excluded for 2 weeks unless a blank certificate which accompanied the exclusion slip was filled out and signed by parent or guardian stating that the child had had measles, in which case he was permitted to return to school at once.

This procedure was carried out from May 5 to June 13 inclusive. Practically no complaints were made against this new practice by the school authorities, teachers or parents. Children who were excluded were ordered to remain at home, away from all other children, but their homes were not placarded. This procedure was carried out in 57 parochial and public schools, and in 128 classes, distributed as follows: 26, kindergarten; 64, 1st grade; 34, 2d grade; and 4, 3d grade.

The enrollment of the various rooms that were closed was 5,104. The number of cases reported from these rooms before they were closed was 995. There were 3,480 excluded, of whom 2,408 returned to school with certificates stating that they had had measles; 1,072 remained at home because they had never had measles. Of the number that remained at home for 2 weeks, 171 developed measles. Of the 2,408 that were permitted to return to school because they brought certificates, 42 developed measles. Out of the total number excluded for 2 weeks, 11 developed measles after they were permitted to return again to school. The 42 children who were certified as having had measles and who developed the disease later, were mostly from schools in poorer neighborhoods. Forty-two is not a large number and speaks very well for the honesty of parents. The fact that only 11 children developed measles after their 2 weeks exclusion from school, proves conclusively that either most of the children that were excluded were immune or that there was no further exposure after they returned to school. In no case was it necessary to close a room for a second time.

About 2 weeks after this practice had been inaugurated we noticed a decline in the number of measles cases reported. Whether this decline was due to the fact that the epidemic had run its course, or to the isolation of sup-

posed susceptibles, is difficult to determine. We believe, however, that the experiment was well worth trying if for no other reason than that it permitted parents to keep their susceptible children home without having any difficulty either with the children or with the school authorities.

The tendency of the health officer in the past has been to do nothing that might interfere with the school attendance of a child. We will probably all agree that nothing is gained in closing schools during epidemics, but wherever it is possible to isolate susceptibles in highly infected rooms, it is at least worth trying.

This same procedure has also been used by the Milwaukee Health Department in connection with an epidemic of scarlet fever in one school. All children were excluded and only those that showed a negative Dick test were permitted to return. The same practice might also be used in the control of other contagious diseases.

LABORATORY

C. C. YOUNG, D. P. H.

NOTES ON LABORATORY TECHNIC

PHILIP H. LOHREY AND JOHN J. DUNN, JR.

Bureau of Bacteriology, Baltimore City Health Department, Baltimore, Md.

THE following short notes record some results which we have found helpful and which may be of use to other laboratories.

We have found in the first place that beef extract can be substituted for the beef infusion used with satisfactory results in the manufacture of Loeffler's blood serum. In cultures from 100 throats containing the diphtheria bacillus the diphtheria bacillus grew on beef extract serum in every case as well as on beef infusion serum, and the growth was as luxuriant in one case as in the other. The beef infusion broth is much more expensive, and the use of beef extract broth lessens the danger of contamination, since it can be made up in smaller quantities. We have therefore adopted this method, as recommended in Wadsworth's *Standard Methods*, in place of the more troublesome beef infusion method.

We have also found it quite convenient to sterilize wooden swabs for throat work in lots of 10, 25, 50 and 100. These swabs can be used by throat inspectors in houses to be released from quarantine, and in mass cultures taken from institutions, without any material waste of swabs, owing to the different number of swabs in the various packages. These bundles are wrapped in brown paper and folded so that they can be sealed with gummed paper in such a way as to prevent contamination.

Berry and Smeaton[1] showed that many specimens of sputum from tuberculosis negative by the direct smear were found to be positive by the Kinyoun method with antiformin and ligroin. Since many laboratories apparently still use the direct smear we thought it might be advisable to call attention to the above work, and also

to describe some comparative work between the direct smear and the Kinyoun method which we have carried out. The Kinyoun specimens were stained by the Ziehl-Neelsen and the ordinary smears by the Schulte-Tigg[2] method.

In 50 examinations of suspected tuberculous sputum we found 14 positive by both methods. We counted the number of tubercle bacilli present in 50 fields, and found that the Kinyoun method yielded 2,606, while the direct smear gave only 1,407. Most of the Kinyoun specimens showed more organisms than the direct smear, although occasionally the latter showed a few more organisms than the former. Such contrasts, however, as 250 bacteria per 50 fields by the Kinyoun method and 63 by the direct smear, 356 to 4; 200 to 13; and 75 to 20, show that specimens of sputum prepared by the Kinyoun method usually contain far more bacteria per 50 fields than those by the direct smear. In early and arrested cases particularly, the chances of finding a few organisms are greater when the Kinyoun method is used than when the direct method is employed.

REFERENCES

1. *Collected Studies from the Bureau of Laboratories of the Department of Health of the City of New York*, V, 7: 308, 1912–13.
2. *Deutsche med. Wchnschr.*, 56, 44: 1225 (Oct. 28), 1920.

THE DIAGNOSIS OF *BRUCELLA ABORTUS* INFECTION IN THE UDDER OF THE COW*

J. P. TORREY

Department of Bacteriology, Michigan State College, East Lansing, Mich.

THE relation of *Brucella abortus* to public health is being recognized by more people all the time. The fact that man may become infected by drinking milk which contains *Br. abortus* has been well established and furnishes a problem which concerns public health men.

The available means of eliminating milk infections are not always practiced and cannot be applied in many cases. Pasteurization is not practical under rural conditions, and is not effective unless properly done. If a clean herd is desired for raw milk it is the practice to identify the infected animals by blood serum reactions rather than bacteriologic examinations, since guinea pig inoculations and cultural methods are slow and expensive. However, the sale of all cattle whose blood reacts to the agglutination test for the purpose of eliminating those animals excreting *Br. abortus* in their milk is not necessary since, in the writer's experience, only 50 per cent of the animals which show a blood reaction carry the *Br. abortus* organism in the udder.

By the application of the Huddleson rapid agglutination test to the milk, practically all animals carrying *Br. abortus* in the udder can be detected. The first few streams from each quarter are drawn into clean test tubes or vials. The strippings should never be used. A composite sample is of little value since only one quarter may be infected. About 3 drops of rennet are then added to the milk and mixed thoroughly. The tube may be put either in an incubator at 37° C. or in warm

* No. 19 (N. S.) Mich. Agr. Exp. Station.

water at about 40° C. If the tubes can be placed in a slanting position, the curd will settle to one side and clear milk serum, with which the test is made, will separate. Serum will form in about 2 hours and may then be used the same as blood serum in the rapid test described by Huddleson.[1] Tests may be made as soon as the serum separates; but, if the sample can be placed in an icebox or cold place, the fine particles of curd will settle and leave a much clearer serum. Sour milk will give an unreliable test. Milk in which the curd has become partially digested cannot be used as this interferes with the test.

This test may be used by an experienced person at the owner's barn to pick out the animals carrying the abortion organism in the udder. If the samples are to be sent to a laboratory, the milk serum should be allowed to form and then poured into another well cleaned bottle or vial. A few drops of an iodine or chlorine disinfectant will prevent the samples from souring.

This test is approximately 98 per cent perfect and may be employed to advantage by city inspectors and city health authorities. Its simplicity and accuracy are such that it can be recommended in preference to any cultural methods known to the writer.

The experimental data on which the above discussion is based will appear in the near future.

REFERENCE

1. *J. Infect. Dis.*, 42: 242, 1928.

VITAL STATISTICS

LOUIS I. DUBLIN, PH. D.

Residence Influence on Cancer Deaths in New York State—This is a study of the influence that residence has on cancer death rates recorded in New York State in 1926 and 1927. The number of deaths from all forms of cancer in the entire state for those 2 years was 27,889; of these 14,479 occurred in New York City, and 13,410 elsewhere in the state. Of the total deaths in New York City, 14,265 were residents of the city and 214 were residents of the rest of the state. The upstate total of 13,410 included 215 New York City residents. The number of cancer deaths in 1926 and 1927 for the various state institutions which are regarded as separate registration areas, numbered 215, all but 32 of them being in hospitals for the insane. The total of recorded deaths from cancer in the state, exclusive of New York City, included 17 residents of foreign countries and 204 residents of other states.

The rates for the urban and rural sections, exclusive of New York City, were affected considerably by the residence element. The number of deaths for the urban district, exclusive of New York City, was 8,441 and of these 7,570 were urban residents, 70 residents of New York City and 801 residents of rural New York. Taking into account the 138 urban residents who died in New York City, 229 in the rural territory and 79 in institutional districts, the total deaths of urban residents numbered 8,016. The recorded urban rate was 125.8 per 100,000 population, the resident rate 119.4. Deaths recorded in rural New York numbered 4,754 and of these 4,456 were rural residents; 69

residents of New York City, and 229 residents of urban communities. These in addition to the 921 who died in other parts of the state made the total resident rural deaths 5,377.

The recorded death rate of rural New York was 116.7 as against 132.0 for the resident rate. Rural residents who died in urban territory represented 15.2 per cent of all rural deaths from cancer while only 2.9 per cent of the deaths of urban residents were recorded in the rural part of the state. The recorded urban rate was higher than the rural rate by 7.8 per cent while the resident rate was lower than the corresponding rural rate by 9.5 per cent. The resident rate of cities from 10,000 to 25,000 considered as a group, 120.0 per 100,000 population, was lower than the recorded rate, 128.0, while in the group of small urban communities under 10,000 the resident rate was higher, 124.9 and 119.6, respectively.

The death rate of the rural territory was directly influenced by the unfavorable age composition of its population and when this fact was given due weight, the resident mortality in the rural area was found to be not higher but probably somewhat lower than in the urban part of the state.—J. V. De Porte, *Am. J. Hyg.*, 10: 201–228 (July), 1929.

Official Vital Statistics of Ireland—The Health Organization of the League of Nations has published a handbook which describes the procedure of the gathering of vital statistics in Ireland. The description is divided into 3 parts, the first for Ireland as a whole prior to 1922, and the other 2 dealing with conditions applying separately to the Irish Free State and to Northern Ireland since 1922.

Prior to 1922, a Census Act was passed during the summer months of the year preceding that in which the census was to take place. The country was divided into enumeration districts, each of which was controlled by an officer of the Dublin Metropolitan Police who acted as the local census enumerator for the district. These reports were sent to the Registrar-General in Dublin. The present systems in both the Irish Free State and Northern Ireland are continuations of the system in use prior to 1922. Among the changes introduced after the establishment of the Irish Free State, was the centralization of all economic statistics, including population statistics, under the Department of Industry and Commerce. The Statistics Act was promulgated in 1926 and provided for an enumeration of the population on April 18, 1926. The system of organization throughout was substantially the same as that prior to 1922. In northern Ireland, the department of the Registrar-General was merged with the Ministry of Finance in 1921 and the latter is responsible for duties formerly carried by the Registrar-General. A Census Act provided for an enumeration of the population on the same date as that of the Irish Free State. The country was divided into census districts and these into enumeration districts, each of which was controlled by a member of the Royal Ulster Constabulary. The actual operation was carefully organized.

Prior to 1922, living births had to be declared to the registrar within 42 days by the parents or other appropriate persons. In default of declaration within the time limit, a fine was incurred. After the expiration of 12 months, the written authority of the Registrar-General had to be obtained to effect registration of the birth. Stillbirths were not registered. The Irish Free State and Northern Ireland both introduced the system used prior to 1922. The certificates are identical to those previously used. In 1923, the Irish Free State began allocating births and deaths

occurring in institutions and elsewhere to the areas of normal residence of the mother or deceased person respectively, instead of to the area in which the death had occurred as was previously done. This same system was adopted in Northern Ireland in 1924. A person present at the time of a death or other appropriate persons were responsible for notification to the registrar of the district within 5 days after the occurrence of the death. The systems for registration of deaths in the Irish Free State and Northern Ireland are identical with that which functioned prior to 1922.

Under the old system, there were 10 infectious diseases that were compulsorily notifiable by the head of the family, or other appropriate persons and also by the medical attendant. A fine was imposed by failure of the proper person to notify the officer. The local authorities could enforce disinfection of premises, but were not obliged to do so. Vaccination has been compulsory since 1863 and every child must be vaccinated before it is 3 months old. The various measures governing the notification of infectious diseases and the procedure followed in the Irish Free State and in Northern Ireland, are substantially the same as those formerly applied to Ireland as a whole.—League of Nations: Health Organization: *Statistical Handbook Series: No. 11*, Geneva, 1929.

Health in Glasgow—The annual report for 1928 has been issued by the medical officer of health of Glasgow. The population was estimated at 1,147,108. The registered births numbered 23,649, giving a rate of 20.62 per 1,000 population, which is the lowest on record. The total number of deaths was 16,729, representing a rate of 13.7 per 1,000, which is the same as in Edinburgh. The infant mortality rate was similar to that of the previous year —107 per 1,000 live births. The maternal mortality rate of 8.79 per 1,000 births was higher than in the preceding 2 years.

The rate for infectious diseases was greater than in 1927, primarily because of the larger number of fatal cases of measles. The figures for tuberculosis were much the same as in the previous year. There were 1,247 deaths from malignant diseases, a reduction of 81.

Treatment of venereal diseases is carried out in 6 of the 13 maternal and child welfare centers. It has become the practice to take blood for the Wassermann test from every pregnant woman attending the municipal antenatal clinics. Of 584 pregnant women so examined, 29 were found to be infected with syphilis. Glasgow is the only area in the United Kingdom in which trachoma is a notifiable disease. Of 127 cases, 111 were born in the British Isles; the age group 15 to 20 had the largest number of cases. An examination of the home contacts of 33 cases notified in 1928 yielded only one case of definite trachoma.—*Brit. M. J.*, 2: 120 (July 20), 1929.

Vital Statistics for France, 1928—The minister of hygiene has published the vital statistics of France for 1928. The birth rate rose from 18.1 per 1,000 population in 1927 to 18.2. The death rate of 16.5 per 1,000 population for 1927 remained the same for 1928. The excess of births over deaths was 70,205 as compared with 65,042 in 1927. The difference in the number of births and deaths for 1928 is the highest since 1924, which shows an excess of 74,577 for the year. The total mortality for France would have decreased to a greater extent if the infant mortality had not increased from 61,817 to 68,100. During the third quarter of the year, 51 per cent more children died under one year of age in 1928 than in 1927.

The infant mortality rate in 1928 was 91 per 1,000 live births, as compared with 83 in 1927 and 97 in 1926.

The results for the first quarter of 1929 with relation to the corresponding period of 1928 have been announced. In the first quarter there was an excess of 70,205 deaths over births. In the corresponding period of 1928, there was an excess of 7,733 births over deaths, and in 1927, an excess of 32,252 deaths over births.

The excess of deaths over births for the first quarter of 1929 is due to a slight decrease in the number of births, and also to a marked increase in the number of deaths. This increase is due to the epidemic of influenza, and to an exceptionally cold winter which increased the mortality from diseases of the respiratory system.—*J. A. M. A.*, 93: 705 (Aug. 31), 1929.

Porto Rico Mortality Statistics, 1928–29—An increase in the mortality of Porto Rico was reported for the fiscal year 1928–29, particularly during the months immediately following the hurricane of September 13, 1928. The deaths directly attributed to the hurricane numbered less than 300. A comparison of the deaths registered in the months following the hurricane with the corresponding months of the preceding year showed a significant increase.

The number of deaths registered in 1928–29 was 40,890 as compared with 29,682 deaths registered in 1927–28, an increase of 11,208 deaths. The death rate for 1927–28 was 20.4 per 1,000 population as against 27.7 for 1928–29. The greatest increases for individual causes were recorded from dysentery (all forms) and influenza (all forms) which increased 882.1 per cent and 730.7 per cent respectively. Diarrhea and enteritis for all ages increased 43.2 per cent, uncinariasis 55.4 per cent, senility 53.6 per cent and congenital debility 40.5 per cent. The lowest proportional increases were recorded from cancer (all forms) 4.2 per cent, tetanus 7.7 per cent, typhoid fever 10.5 per cent, tuberculosis (all forms) 23.1 per cent and all external causes 24.6 per cent.

The increase of 1,710 deaths from diarrhea and enteritis 2 years and over was due in part to the correction of a statistical error in tabulating, children 2 years old having been included in the group under 2 years instead of in the group 2 years and over. A comparison between the mortality of 1928–29 and that of the preceding 5 years showed that the increase began in September. The average number of deaths that occurred in each month of the 5-year period was considered as normal. For July and August, 2,760 and 2,598 deaths respectively were reported and these figures corresponded to the normal. In September, there were 3,121 deaths or 675 over the normal figure. The mortality rose abruptly during the months of October and November. In December, the greatest number of deaths was recorded, 4,436, an increase of 1,744 deaths over the normal figure. The rate began to decline rapidly in January.

The average annual number of deaths registered in Porto Rico for the 5-year period, 1923–24 to 1927–28, was 30,560. The deaths for 1928–29, 40,890, showed an increase of 10,330 deaths which represented an increase of 33.7 per cent in the mortality.—M. A. Peréz, *Porto Rico J. Pub. Health and Trop. Med.*, 5: 54–58 (Sept.), 1929.

A Study of Autopsies in Haiti—A series of 700 consecutive autopsies were performed at the Haitian General Hospital, Port au Prince, from June, 1926, to January, 1928. The hospital is centrally located and the findings should be fairly representative of the mortality rate of the island.

The most outstanding cause of death

was pulmonary tuberculosis, which caused 26 per cent of the total. Lobar pneumonia caused 55 deaths. The gastrointestinal system was responsible for death in 33 or 4.7 per cent of the cases. Of these, 10 were due to typhoid in 1927 and 3 in 1928. No deaths resulted from bacillary dysentery or intestinal protozoal infestations.

Cirrhosis of the liver is not especially common, there being only 10 cases in this series and only 3 of these of the typical atrophic type. Acute nephritis is rare although chronic nephritis is quite common, causing 61 or 8.7 per cent of the total deaths. Endocarditis, both acute and chronic, is rare in Haitians. Two cases of acute mitral disease were found in terminal acute infections and 5 of chronic endocarditis.

Malignant disease was found to be just as common in Haitians as among people in the temperate zones, and the cell type differed in no way from those common to Caucasians. There were 21 deaths from malignancy in this series. Distant metastases were not common. Over 65 per cent of the cases had a clinical history of either syphilis or yaws infection at some time during life. There were 10 definite cases of yaws, 8 of which were aneurysms of the aorta, one a gumma of the brain and the other a spontaneous cerebral hemorrhage.—R. M. Choisser, *U. S. Nav. M. Bull.*, 27: 551–568 (July–Oct.), 1929.

Malaria Survey of Island of Jamaica—Malaria in Jamaica is largely, if not altogether, confined to the coastal plain lowlands. For the last 20 years the intensity of the disease over the entire island has been diminishing. The number of reported deaths from malaria from 1880 to 1900 had a sharp upward trend and after 1910 had an equally strong downward trend. A further study of incidence made from records of 19 general hospitals on the island corroborated the trends revealed by the mortality statistics. There was a decided parallelism shown between rainfall and the intensity of malaria. Of 15 separate years in which peaks of malaria incidence occurred, in 6 cases the rainfall during the same year was excessive. The seasonal distribution of malaria was studied using as a basis 61,097 cases admitted to hospitals on the island from 1910–1919. This showed the minimal incidence in May with a peak in August and a further increase until the annual maximum was reached in November.

In order to secure further data for determining the distribution and incidence of malaria, an examination of a random sample of children attending government schools was made. The entire group numbered 11,998; both sexes were included and the majority were between 5 and 14 years of age.

Splenomegaly was used as an index to the distribution of malaria. The children were tested for enlarged spleens; all of those showing splenomegaly and one-half of those with normal spleens were tested for parasites. Of the 5,742 children with normal spleens 318 or 5.54 per cent showed parasites and 256 or 36.5 per cent of the 703 children with enlarged spleens harbored parasites. From these data, the distribution of malaria was determined, schools in which parasitic or splenic indices were in excess of 25 per cent representing areas of high malaria endemicity and indices below that as areas of low or moderate endemicity. The highest splenic and parasitic indices were found under 500 feet of elevation, the next highest from 501 to 1,500 feet and generally none above 1,500 feet.—M. F. Boyd and F. W. Aris, *Am. J. Trop. Med.*, 9: 309–99 (Sept.), 1929.

PUBLIC HEALTH ENGINEERING

ARTHUR P. MILLER, C. E.

Treatment of Waste Waters From Abattoirs—The writer of this article describes 2 methods found quite successful under certain conditions for the treatment and disposal of the characteristic abattoir waste water in unsewered districts.

The first method described is that of absorption by the soil under certain refinements as to preparation and cultivation of the area to be used. For a 3,000-gallon per day waste, 5 to 6 acres of land are fenced off, ploughed lengthwise and crosswise to a depth of 8″, divided into 2 sections, each of which is again subdivided into 5 plots, each plot being harrowed and graded so that the cross-section is fairly level and longitudinal section has a fall to lower end. Each plot, assuming 5 working days, will care for one day's water per week. The care and operating attention which should be given is described, particularly as to trenching, harrowing, and rotation in use of plots.

Another method found to be very successful is that of passing the waste water through a process by which the temperature is raised and then discharging it to a tank where chemical treatment is given and where it is allowed to stand for a precipitation period of 1 hour. The effluent, practically clear by this time, is then filtered through a sand bed. The necessary plant for this type of treatment comprises a steam pipe from the boiler, with valves for regulating the supply of steam, 2 ejectors, pipes and valves for regulating the flow of water to the ejectors, 4 brick or concrete tanks of varying capacity, and a sand filter bed. A rather complete description of the operating features of a plant of this kind is given, assuming a waste water production of 4,000 to 5,000 gallons per day.—W. J. Trevaskia, *Proc. of The First Commonwealth Conference on Public Health Engineering*, Commonwealth of Australia, pp. 207–211. Abstr. H. N. Old.

Studies Relative to the Significance of the Present Oyster Score—This paper is an excellent discussion of the results of a vast amount of laboratory work done in connection with the sanitary control of shellfish problems conducted by the State of Maryland. The importance of the article to those who are engaged in shellfish sanitation activities is such that the summary in full is quoted here as follows:

1. A comparison of the scores of over 400 water samples and the same number of corresponding oyster samples revealed a general trend for oyster scores to increase with increasing concentrations of colon-aerogenes group members in water. The effect of temperature on this relationship was also observed. The relationship was found to be about the same with water temperatures of 60° F. or less and above this temperature. In no case could the relationship be expressed by means of a fixed ratio. Individual oyster scores varied so consistently and widely from the hypothetical value that it was found impossible to estimate oyster scores with any degree of accuracy from a knowledge of water scores, tides, and temperature.

2. A remarkably close correlation was found between oyster scores and temperature. In considering 363 oyster samples from 2 areas a score of 50 or more was seldom found with water temperatures of 60° F. or less, whereas with temperatures of 75° to 85° F. seventy per cent of the oyster samples had scores of 50 or more and nearly fifty per cent 410 or greater.

3. The score of shucked oysters must be interpreted differently than the score of fresh shell stock. The former score indicates the degree of care in the packing process. Increased scores and total 37° C. bacterial counts have been found to result chiefly from unclean utensils. Lack of plant cleanliness and proper refrigeration permit multiplication of bacteria present in the shell stock or introduced during the handling process. Due to the fact that both the total 37° C. bacterial count and the score of shucked oysters represent a general lack of cleanliness rather than fecal contamination, the more inclusive total 37° C. bacterial count has been found particularly valuable for indicating the efficiency with which an establishment is being operated. There is apparently no reason why oysters cannot be packed in such a way as to give results just as satisfactory as those obtained in an efficient dairy for the production of certified milk.

4. The general topography of a body of water together with the effect of winds and tides causes stratification of water. In some cases, this condition may become so pronounced that water of excellent bacterial quality may be found at the surface while water grossly polluted may exist near the bottom. The average 37° C. bacterial count for all samples from the bottom was consistently higher than for samples taken just beneath the surface. Due to the fact that the water near the bottom obviously most influences oysters and the wide variations in bacterial content which may occur, the most satisfactory routine procedure is to secure bottom samples under tidal conditions judged to produce maximum pollution.

A bibliography of 14 references is appended.—C. A. Perry, *Am. J. Hyg.*, 8, 5: 694–722 (Sept.), 1928. Abstr. H. N. Old.

Sodium Aluminate as a Coagulant in Chemical Treatment of Cannery Waste Waters—The H. J. Heinz Company discharges a large volume of tomato waste which finally finds its way into the city storm sewer and then flows out into a farming community. This organic matter in the sewage putrefies rapidly and gives off offensive odors. A successful attempt was made to treat the cannery waste with lime and sodium aluminate. This solution was made up of 1 pound of lime and 0.16 pound of sodium aluminate to a gallon of water and was added to the waste in sufficient quantity to produce a good floc and to yield a pH of about 10. The effluent is stable and has no turbidity. No odor was noticeable in the ditch over a mile below the cannery.—J. A. Holmes and G. J. Fink, *Indus. & Eng. Chem.*, 21, 2: 150–151 (Feb.), 1929. Abstr. Frank Raab.

Abating Black Smoke Will Not Solve the Problem of Atmospheric Pollution—The general conception is that the abatement of black smoke prevents atmospheric pollution. This is not the case, however, because the elimination of black smoke does not necessarily prevent pollution of the air with ash particles and large quantities of sulphuric acid. In fact, the more efficient combustion of pulverized fuel leads to a marked increase in the amount of fine ash in the products of combustion. Elaborate studies reveal that the size of the suspended solids range from 0.2 to 1.5 microns. These small particles do not settle as in the case of the grosser soot and, therefore, a measure of the so-called "soot-fall" is not a satisfactory measure of the seriousness of atmospheric pollution. Studies in Cleveland indicate that there are 3 mg. of suspended solids per 100 cubic feet of air. Calculations indicate that this quantity of suspended solids amounts to 20,000 tons per year per square mile of city area when only the lower 200 feet of atmosphere is considered in the calculation and when the mean wind velocity of 11 miles an hour is utilized. The author concludes, therefore, that atmospheric pollution can only be abated by preventing ash and sulphuric acid from being discharged into the air from stacks.

Three methods of treating the products of combustion to remove undesir-

able constituents are mentioned; namely, electrical precipitation, centrifugal collection and bag filtration. It is admitted that sulphuric and sulphurous acids have not been removed from products of combustion; yet the possibility of washing the products of combustion with lime solution is mentioned. —R. D. MacLaurin, *Am. City*, 40, 5: 135–137 (May), 1929. Abstr. Charles R. Cox.

Small Filters for Household Use —Small filters for household use where there is no regular controlled supply must fulfil 2 purposes—they must clear the water of suspended matter and they must remove bacteria. It is also necessary that purification, sterilization and renewing of filter material shall be simple, convenient and cheap. No filter in continuous use remains impervious to bacteria and therefore a filter material is necessary which can be sterilized easily by boiling.

The earliest form of small filter was the clearing filter of charcoal. Then with the use of clay and porcelain came true bacterial filters. China filters in candle shape were introduced by Chamberland and with a development of this—the Berkefeld filter—with daily sterilizing a continuous germ-free filtrate can be counted on with a considerable degree of certainty. Other developments are the Doulton filter and one produced by the Seitz Works in Kreuznach, in which the filter material consists of specially prepared asbestos boards.

The chief difficulty lies in the fact that, in spite of attention and purification, bacteria grow through filter material and pollute the filtrate. This has been found to be preventable by the destruction of the bacteria in the filter by metals or metallic compounds, especially metallic silver. Bechhold has worked out an impregnating compound, the composition of which has not been divulged, and has tested its effect on filters of porcelain, kieselguhr and charcoal. The best results were obtained with porcelain filters with an average pore size of 3.8–10 microns and kieselguhr filters with somewhat bigger pores. An impregnated kieselguhr candle-shaped filter worked 5 months giving an exceptionally sterile filtrate.

Experiments were made with a filter supplied by a Hamburg firm in which the filter material was made of kieselguhr, kaolin and cement pressed into a metal case under heat while air was blown through under slight pressure. The filter core can be easily removed and renewed.

The density of the filter was tested by blowing air through while the filter was immersed in water and the greatest pore width was calculated. The average rate of permeation per sq. cm. of surface was determined by allowing tap water to run through under slight pressure.

The removal of bacteria was found to be practically complete if the filter was sterilized before filtration, but frequent sterilization was necessary.

The filter appeared good for both clarification and removal of bacteria. It must, however, be made to fit the other requirements, ease and certainty of manipulation and cheapness.—*Strunk. Tech. Gemeindebl.*, 32, 10: 144, 1929. (From Papers of Water Pollution Research Board, England.)

The Drinking Water Supply in Holland—Great advance has been made in Holland in the distribution of water since the first water works were established at Amsterdam in 1853. In 1928, all the large towns, numbering about 70, and about 400 out of the 800 rural parishes possessed water supplies. In Holland the daily consumption per head, amounting to 98.5 litres, is low in

comparison with England and America, because the industries mainly possess their own supplies of water. The majority of the water works are under public administration. In 1913 a new section for dealing with all matters relating to water supplies was established under the Public Health Department. A short survey is given of the hydrogeological conditions of the country in relation to the water supply.

Underground water is obtained from the sand-dunes in the littoral region. Iron and manganese are removed from the water before use. Natural springs are very scarce and river water is used to a great extent. All surface water is purified by sedimentation and rapid filtration before distribution. Amsterdam and the Hague have a dune underground and Rotterdam, with Delft, Schiedam, etc., have a surface river supply. Reference is made to the new purification plants for river water at Zwijndrecht and for underground water at Zutphen.—W. F. J. M. Krul and F. A. Liefrinck, *Rapport en Mededeeling v. h. Rijksbureau v. Drinkwatervoorziening. Mededeling No. 8.* (Papers of Water Pollution Res. Bd., England.)

The Grading of Milk—The grades of milk in Scotland, as laid down by the Milk (Special Designations) Order of 1923, are: (1) certified; (2) grade A (T. T.); (3) grade A; (4) pasteurized; (5) grade A pasteurized.

Briefly, certified milk is milk produced from cows which are examined at least 3 times a year by a veterinary surgeon and which have passed the prescribed tuberculin test at intervals of 6 months. The milk must be cooled and bottled on the farm and is delivered to the consumer in these bottles, and must at no time contain more than 30,000 bacteria per c.c.; no coliform bacillus in 0.1 c.c. and not less than 3.5 per cent butter fat.

Grade A (T. T.) milk is derived from cows which have passed the prescribed tuberculin test, but the milk need not be bottled on the farm by the producer. The milk must not, at any time before delivery, contain more than 200,000 bacteria per c.c. and no coliform bacillus in 0.01 c.c., and must contain not less than 3.5 per cent butter fat. It must not be heat-treated.

The requirements for grade A milk are the same as for grade A (T. T.) except that the cows need not be tuberculin tested. The cows must, however, be examined 3 times a year.

Pasteurized milk is heated to a temperature of 145 to 150° F. for one-half an hour and subsequently cooled to below 50° F. The type of equipment and methods employed must be satisfactory to the local health authority. Pasteurized milk must not contain more than 100,000 bacteria per c.c.

Grade A (pasteurized) milk is grade A milk which has been pasteurized. The bacterial count must not exceed 30,000 per c.c. and there must be no coliform bacillus in 0.1 c.c. The author discusses the various grades, giving the advantages, disadvantages, etc. —James McAllan, *J. State Med.*, 37, 4: 229–39 (Apr.), 1929. Abstr. P. R. Carter.

INDUSTRIAL HYGIENE

EMERY R. HAYHURST, M. D., AND LEONARD GREENBURG, PH. D.

Report of Committee on Industrial Fatigue*—The committee's work during the past year was chiefly educational. The coöperation of some group has been hoped for that would undertake a controlled study of the relative importance of the intrinsic factors in the causation of industrial fatigue as compared to the extrinsic factors. A wide distribution of the *Bibliography on Industrial Fatigue and Allied Subjects* has been made and a second printed edition prepared comprising a bulletin of 38 pages, which includes chiefly material published in English, from January, 1921, to May, 1929. Each citation is briefly abstracted. In the citations covered the committee is impressed by the continued neglect to consider the intrinsic factors in fatigue, such as the readily recognizable physical disabilities and the widely prevailing types of "silent" sickness or organic defects that have progressed to a point affecting the working power of the organism and yet not placing the sufferer on the sick list.

Recent analysis of 100,000 health examinations of insurance policy holders made by the Life Extension Institute, the research being conducted by Edgar Sydenstricker of the Milbank Fund, in coöperation with Rollo H. Britten of the U. S. Public Health Service, shows that there is an increase in the ratio of organic impairments with increasing age. It is noted that at the age 60 the impairment rate is more than three times that at 25. Impairments may not directly affect the work curve of a group but, what Benedict has so sweetly termed "autogenic reinforcement," has to be considered—the power of man to resist the onset of pathological fatigue, and the influence of training in enabling a skilled worker to maintain for a time the peak of activity even though, in a sense, ill and tempted to slow up.

From the above, the desire for a controlled study seems obvious, yet in the literature abstracted since 1928 no important research has given consideration to the intrinsic fatigue factors. The emphasis is still upon the environmental factors.

Here and there appears a ray of light. Joshua E. Hannum in the *Journal of Industrial Psychology* indicates that at the Whiting-Davis Company there was an increased production of 27 per cent in one month's time through the correction of vision in one department employing 200 operatives. Another article by C. Fenno Faulkner in *Factory* suggests a research on what types and conditions of men are physically unfitted to withstand continuous noise. Another article by Glen L. Gardner, also in the *Journal of Industrial Psychology*, makes the statement that probably more workers break down early in life from overworking their stomachs than their muscles. The question is asked: "Is the working population of this country in an ideal physical state, and if not how far below that state on the average?" As yet we have no answer

* Abstract of the Report (Eugene L. Fisk, *Chairman*) presented to the Industrial Hygiene Section of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 4, 1929.

Requests for the second edition of the *Bibliography on Industrial Fatigue* should be made to Dr. Carey P. McCord, 34 W. 7th St., Cincinnati, O.; to the Chairman of the Committee, Dr. Eugene L. Fisk, Life Extension Institute, 25 W. 43d St., New York, N. Y.; or to the Association office, 370 Seventh Ave., New York, N. Y.

Report of Committee on Lead Poisoning*—The 2d Annual Report of the Committee on Lead Poisoning of the Section on Industrial Hygiene of the A. P. H. A. was presented at the Minneapolis Meeting. It includes (*a*) Standards and (*b*) A 2-page synopsis of the Bibliography for 1928, and as such comprises 56 pages in addition to a foreword, the whole submitted as a progress report upon the standards for diagnosis, clinical forms, terminology, and symptomatology; also, compensation relations in connection with the three usual classes of cases: (1) those with positive disability; (2) those with doubtful disability; (3) those without disability.

"Standards of treatment" devotes several pages to curative treatment, divided into that for immediate toxic manifestations, and that for "deleading." Standards for industrial control lay down a definite plan of procedure with directions for workplace hygiene, rules for personal hygiene, medical supervision, and the regulations of hours of labor.

The statement concerning Bibliography is a brief summary to the effect that 265 citations were listed for the year 1928, of which 112 were abstracted to the date of the report.

A mimeographed copy of the Report may be obtained by members of the Section at the cost of 10 cents. Others may obtain copies at 50 cents each. The *Bibliography*, which comprises 27 pages with approximately 10 items to the page, will be made available in mimeograph form at 75 cents per copy. An accompanying code enables most of the abstracts to be found readily in current abstracting journals, but the committee can supply copies of the abstracts made at a cost of 5 cents each for those not exceeding ½ page, and 10 cents for those longer. All communications concerning copies of either the Report itself or the Bibliography should be addressed to Dr. Carey P. McCord, Secretary, Section on Industrial Hygiene, 34 W. 7th St., Cincinnati, O. Those interested should communicate with the Secretary at once as it seems advisable to set a date for such requests not exceeding 60 days from the publication notice hereof, in order to estimate the ultimate number of copies to be made up.

Deaths from Lead Poisoning, 1925–1927—This is an analysis of lead poisoning from the mortality statistics of various civilized countries of the world, and reaches the conclusion that as a cause of death lead poisoning is decreasing materially (valuable case records, abstracts, quotations, and tables accompany).—Frederick L. Hoffman, U. S. Bureau of Labor Statistics, *Bull. No. 488*, June, 1929, 37 pp.

Progress of Ratification of the White Lead Convention—The Convention of the League of Nations covering the control of the use of white lead has been ratified by Cuba, Bulgaria, Chile, Czecho-slovakia, Estonia, Finland, France, Greece, Latvia, Luxemburg, Norway, Poland, Rumania, Spain and Sweden. It has been ratified likewise conditionally in Hungary; approved by competent national author-

* Abstract of the Report (Emery R. Hayhurst, Chairman) presented to the Industrial Hygiene Section of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 4, 1929.

ity in Italy and the Netherlands, and recommended to competent national authority for approval in Germany and Uruguay. Various forms of legislation are also reported in progress on the measure in Switzerland and other countries.—Table Insert, *Industrial and Labour Information*, 31, 10 (Sept. 9), 1929.

Medical Services for Seamen Ashore and Afloat*—Medical service for American merchant seamen was begun in 1798 by the U. S. Public Health Service, but it was not until 1881 that a medical hand book, *The Ship's Medicine Chest*, was prepared. Millions of dollars are now spent annually for the treatment of disabled American seamen, a service without cost to them. All seamen undergo a thorough physical examination before employment. If rejected, the applicant is informed of the nature of his defects and advised to have them corrected. A health record of each seaman is kept.

It is aimed to maintain standards of general sanitary conditions, ventilation, and heating on board, and for the latter purposes blowers are supplied. Food is rigidly inspected and supplied in sufficient quantity and quality. All food handlers are carefully examined each trip. A constant campaign against bed bugs, cockroaches, rats, and mice is maintained. There is little sanitary danger in the water used by ships. Salt water should not be used in a bath as it may be polluted. Standards are suggested for bathing and laundering facilities, heads and urinals, and waste disposal.

Employment records for the past two years show that 40 per cent of the rejections are for venereal diseases, while the Service has charge of the medical treatment of seamen ashore and is also promoting an extensive educational work in venereal and related fields (the ship's hospital and medicine chest are described). All ships carrying 50 or more passengers, other than those in the cabin, are required to carry a competent physician, while emergency treatment at sea can be promptly and usually adequately administered, for which medical advice by radio is arranged.

Maritime laws cover the matter of provisions and water, complaints in regard thereto, crew accommodations, medicines and antiscorbutics, care of bodies after death, washing accommodations on new vessels, and fumigation. In vessels constructed between 1895 and 1915 the law provided 72 cubic feet, and not less than 12 superficial feet, for each seaman or apprentice in the quarters allotted to him, this space to be kept free from goods or stores of any kind. For all vessels constructed after March 4, 1915, the law requires not less than 120 cubic feet and 16 sq. ft., respectively.—Lyle Jordan Millan, M.D., Examining Physician, Bureau of Operations, U. S. Shipping Board, Washington, D. C.

A Study of Body Radiation—Rubner states (see page 20, Leonard Hill, *The Science of Ventilation and Open Air Treatment*) that "for an average man, in still air, the loss of heat is distributed as follows: Warming of inspired air, 35; warming the food, 42; evaporation of water, 558; convection loss, 823; radiation, 1,181; total loss, 2,700 kg. calories." (From these figures it will be seen that approximately 44 per cent of the body's heat is lost by radiation; 31 per cent by convection; 21 per cent by evaporation; and the small balance, by the warming up of inspired air, ingested food, and miscellaneous loss.)

The present study bears out these

* Abstract of paper read before the Industrial Hygiene Section of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, Minn., October 3, 1929.

findings of Rubner rather closely and would appear to indicate that not enough attention has been given to the factor of body radiation as a means of heat loss in mechanical heating and ventilation schemes, which have been principally directed toward loss of heat by convection.

Some results of the present study are:

1. The radiation from the skin and clothing is approximately that of a "black body" or perfect radiator.

2. (Omitted.)

3. A cloth-covered, vertical, cylindrical calorimeter at body temperature loses in still air 60 per cent by radiation, 40 per cent by convection. A similar horizontal calorimeter loses 54 per cent by radiation, 46 per cent by convection. The human body convection loss is probably similar to this; that is, the convection loss is roughly one-third less than radiation loss, in still air and normal room temperatures.

4. Increasing air motion rapidly decreases the percentage radiation loss and increases the convectional (loss).

5. (Omitted.)

6. Increase in room temperature (which also means increase in wall temperature) produces a progressive lowering of radiation loss. The ratio, radiation loss vs. basal metabolism, decreases with increase of room and wall temperature.

7. (Omitted.)

8. At normal indoor temperature, in still air and with the subject normally clothed and at rest, body heat losses are distributed as follows:

Evaporation of water	24 per cent
Radiation	46 per cent
Convection	30 per cent

9. Air temperature falls to room temperature very rapidly as the distance from the body increases, so that at a distance of 30 cm. (about 1 ft.) no effect of the presence of the body could be detected.

10. The Abbot-Benedict work indicates that the radiation loss from a nude subject is about twice as great for a room temperature of 15° as it is for a room temperature of 26° C. This evidence does not entirely support the "suit of clothes" theory referred to by Du Bois. In explanation of this theory, he says (p. 385, 1927 Ed. "Basal Metabolism"): "A constriction of the peripheral blood vessels (occurs) and the amount of heat carried to the surface is relatively small in proportion to the heat produced. The patient really changes his integument into a suit of clothes and withdraws the zone where the blood is cooled from the skin to a level some distance below the surface."

11. Normal fluctuations in humidity indoors produce negligible effect upon the radiation loss. Our bodies radiate almost wholly between the wave lengths 4 μ and 50 μ with a maximum at 10 μ. Were the air of the room exceedingly dry, changes might be noticeable.

"Interesting and important questions concerning the comfort and welfare of children in classrooms are inadequately answered today. It is hoped that this report may in some degree help towards a better understanding of these problems."—L. B. Alrich, *Smithsonian Miscellaneous Collections*, 81, 6 (Publication 2980): 54 (tables and illustrations), Dec. 1, 1928.

Low Back Pain—The author discusses the subject from an anatomical, physiological, and evolutionary point of view, and considers, under causation, acute trauma, recurrent trauma, arthritis, malignant disease, anatomical variations, and muscular lesions (two pages of discussion accompany).—Fred C. Kidner, *Bull. Am. Assn. Indust. Phys. & Surg.*, III, 4: 1–8 (Oct.), 1929.

Special Pamphlets on Occupational Diseases—

Fume Poisoning from Nitric and Mixed Acids, *Safe Practices Pamphlet No. Chem. 2*, 3 pp., Illus.

Chemical Burns, Their Nature and Treatment, *Safe Practices Pamphlet No. Chem. 3*, 3 pp., Illus.

Carbon Monoxide, *Health Practices Pamphlet No. 7*, 5 pp., Illus.

Infected Wounds, *Health Practices Pamphlet No. 8*, 3 pp., Illus. National Safety Council, 108 E. Ohio St., Chicago, Ill.

FOOD, DRUGS AND NUTRITION

WALTER S. FRISBIE

Influence of Inorganic Elements on Blood Regeneration in Nutritional Anemia—Reference to the use of inorganic elements in addition to iron in the treatment of anemia is found in the older textbooks on therapeutics. These include arsenic, manganese, copper and mercury. Reference is made particularly to the work of Hart and Steenbock and coworkers (Abstract in *A. J. P. H.*, 18: 1058 (Aug.), 1928) who found that copper was essential in supplementing the iron to produce hemoglobin regeneration. In view of the effect of other inorganic elements such as manganese and germanium reported by other workers, the authors studied additional inorganic elements closely associated with copper in the atomic scale. All of the work was done on young rats which had been made anemic by whole milk diet soon after weaning. Marked regeneration was noted when manganese, nickel, copper, germanium and arsenic supplemented the iron in nutritional anemia in amounts of 0.05 to 0.5 mg. daily. Cobalt, 0.05 to 0.5 mg., had a slight effect. While these experiments will confirm the observations of other workers in the ability to secure regeneration with iron alone they do not confirm the experiments of Hart and Steenbock who found copper a necessary supplement. The authors reserve final decision on this discrepancy but feel the experiments have demonstrated the supplementing action of the elements named, all of which except nickel have in the past been recognized as therapeutic agents in anemia.—Victor C. Myers and Howard H. Beard, *J. A. M. A.*, 93: 1210 (Oct. 19), 1929.

Vitamin B Content of Different Yeasts and the Wheat Breads Made from Them—In these experiments using the protective methods in pigeons or rats 3 kinds of yeast were used, one brewer's yeast and two compressed yeasts, one of which was made from molasses and the other from a grain mash. In the case of pigeons 0.4 to 0.5 gm. of dry substance of molasses yeast was necessary to protect from vitamin B deficiency, as against 0.3 to 0.4 gm. of the grain yeast. In experiments on pigeons on a vitamin B free diet of polished rice, it was found that the content of the antineuritic factor of both of the compressed yeasts was less than that of the brewer's yeast, the latter being about three times as potent. There was found to be scarcely any difference in the case of anti-pellagric or growth promoting factor.

There is a possibility that the method of manufacture of compressed yeast is responsible for the total vitamin deficiency. In the case of bread, the experiment was limited by the difficulty experienced in inducing the pigeons to consume sufficient amounts of the diet to afford vitamin B protection. Bread containing three times the usual amount of compressed yeast did not afford protection.

In the experiments with rats it was evidenced that the bread made with baking powder was inferior to that made with yeast but satisfactory comparison between the different yeasts was impossible here because of the inability of the rats to consume sufficient bread. The authors conclude that to have added more yeast to the bread would

have materially altered the fundamental character of the bread.—Arthur Scheunert and Martin Schieblich, *Biochem. Ztschr.*, 212, Band. 1–3, Heft: 80 (Aug. 31), 1929.

Influence of Vitamins A, B, D, Iron, Copper, Beef Muscle, and Liver on the Course and Regeneration from the Anemia of Rice Disease—Among the factors in experimental anemia are the vitamins, and recent work has demonstrated that not only a stronger anemia develops in the absence of vitamin B, but that its addition is followed by more prompt recovery than in the case of vitamin A.

In this experiment adult male rats, after attaining a basal weight level, were placed on special diets for a 10-week period. Eight different diets were tried, chiefly rice with various supplements, and bi-weekly observations including body weight, erythrocyte counts and hemoglobin estimation were made. Polished rice diets, cooked and uncooked, resulted in a decrease in body weight and hemoglobin level, the former proportionately greater than the latter.

Supplements of cod liver oil as a source of vitamin A were of little or no benefit. The addition of 2 per cent of compressed yeast resulted in loss of only 5 to 10 per cent body weight and of only 3½ per cent in blood count with a parallel hemoglobin figure. A supplement of iron (ferric ammonium citrate equivalent to 10 mg. iron daily) resulted in a greater loss both in weight and in erythrocyte count than with rice alone. When both iron and copper were added, there was less loss of red blood cells than with iron alone but still greater loss than in the control groups.

Comparisons of diets were made by substituting lean beef for rice, adding 2 per cent rice, substituting liver for rice and cod liver oil, substituting liver for cod liver oil alone, and the addition of yeast. These substitutions resulted in a more complete remission of the anemia observed and the greatest effect was produced by the lean beef muscle followed in order by liver, yeast, liver added to rice and yeast, yeast added to rice, copper and iron, and yeast added to rice and iron. Weight recovery was complete in 4 weeks.—R. W. Whitehead and O. W. Barlow, *Am. J. Physiol.*, 89: 542 (Aug. 1), 1929.

Anti-Scorbutic Vitamin in Cabbage Soup, Cabbage Puree, and Turnip Juice—E. Tso (*Chinese J. Phys.*, 2, 4: 403–408, 1928). In an attempt to find inexpensive sources of vitamin C for infant feeding in northern China, the author has tested the possibility of utilizing the native cabbage (Brassica pekinensis) and Chinese winter turnip (Raphanus sativus) in the form of soup, puree, or juice. The cabbage soup was prepared by cooking shredded cabbage with an equal weight of tap water for 15 minutes' actual boiling time, cooling, straining, and adding table salt to taste.

The puree was prepared by cooking shredded cabbage for 15 or 20 minutes in as little water as possible and rubbing the material through a sieve. Turnip juice was prepared by grating the entire root, including the skin, and straining it through cloth. In the feeding experiments, guinea pigs weighing from 240 to 350 gm. were fed a basal diet of soy bean meal 30, mung bean flour 30, millet meal 30, sodium chloride 1, calcium carbonate 2, and cod liver oil 2 parts, the ingredients being made into a semi-solid paste by cooking for from 30 to 40 minutes with water in a double boiler.

On this diet death from scurvy is said to take place invariably within 4 weeks. From 2 to 3 animals were used for each amount of the materials tested. The minimum amounts for

protection against scurvy and normal growth during an experimental period of 5 months were 30 c.c. daily of cabbage soup, from 5 to 10 gm. of cabbage puree, and 20 c.c. of turnip juice, respectively.—*Exper. Sta. Rec.*, 61: 193–194 (Aug.), 1929.

Rye Bread Poisoning—Report of an outbreak of illness alleged to be due to the consumption of rye bread made from rye meal contaminated with ergot (Ashby and Robertson, *Brit. M. J.*, 1: 318, 1928) was the basis of an investigation conducted by the Ministry of Health of Great Britain. The object of the investigation was to obtain facts regarding the nature of the illness, its causation, the likelihood of similar outbreaks, and preventive measures for control.

There were about 200 cases involved in this outbreak, all the victims exhibiting similar symptoms, with the exception of one that developed gangrene. In general these symptoms were developed over a period of approximately two years, the indisposition starting with coldness of the feet, weakness of the knees, pain, headaches, general marked itching of the skin, blanching of the fingers, and severe formication.

Removal of rye bread from the diet resulted in convalescence and recovery. Investigation of the source of the rye used for the breadmaking revealed that in general the rye was grown in the districts of Yorkshire, Lancashire, Cheshire, Monmouth and Essex, where these crops are seldom, if ever, free from ergot infection. It was further ascertained that the rye was neither cleaned nor screened before being ground into meal. The rye meal was used in breadmaking in the proportion of 1 part rye to 4 parts wheaten meal. Very little of the rye was used in the form of rye flour in making this type of bread. Since this outbreak, Canadian milled rye flour, said to be free from ergot, has been substituted for the meal.

As a result of the investigation, the author presents the following interesting facts: That the rye bread is eaten to a large extent in the locality under investigation by Jews, and rye for these towns is obtained almost exclusively from the ergot infested districts. Practically all of the victims in this outbreak were of Jewish extraction.

On the assumption that some of the rye consumed in Manchester contained 1 per cent of ergot, a half-pound loaf of bread containing this rye as a constituent would contain 4 to 5 grains of ergot. It is possible, therefore, that if consumed over lengthy periods, especially if the ergot were in an actively toxic state, pathological conditions might ensue.

While the samples of rye actually examined were not found to be toxic, this may be accounted for on the ground that the samples were at least 6 months old, and that the methods of analysis were faulty. The clinical characteristics of the outbreak, as far as they have been investigated, strongly support the fact that ergot was responsible.

In view of the potential danger, preventive measures were recommended to be put into operation. Rye crops should be grown with the necessary precautions to reduce the risk of ergot infection to a minimum. For human consumption, it is necessary to remove by suitable methods any small proportion of ergot which the rye may contain.—M. T. Morgan, *Brit. J. Hyg.*, 29: 60 (Apr.), 1929.

Influence of "Chilies" (Capsicum annum L.) on Digestive Functions and Metabolism—The widespread use of chilies or capsicum in tropical countries has led to this experiment to determine the effect on the gastric, salivary and other secretions. The effect of capsicum on the flow of saliva

was studied both in man and dog and found to produce copious secretions. Gastric secretion in dogs was studied and it was found that the mucous secretion was slightly increased, but it does not affect the acidity of gastric juice, nor of the gastric response. Slight increase in gastric motility in dogs was noted. In the case of individuals accustomed to eat peppery food, capsicum was without effect on the basal metabolism in amounts up to 100 gm. fresh capsicum. The opinion is offered that those accustomed to eating capsicum may have developed a conditioned reflex.—Te-Pei Feng, *Proc. Soc. Exper. Biol. & Med.*, 26: 273 (Jan.), 1929.

Experimental "Food Poisoning" in Monkeys with Living Paratyphoid Bacilli—Since in previous experiments the symptoms of food poisoning were not reproduced when enormous numbers of heat-killed paratyphoid bacilli were fed to monkeys and other animals, and no symptoms were produced when large amounts of heat-killed paratyphoid cultures were swallowed by human volunteers, it was concluded that the thermostable substance known to be toxic to animals on intraperitoneal inoculation is not the substance responsible for the gastrointestinal outbreaks with which paratyphoid bacilli are associated. Accordingly, experiments were carried out in which monkeys were fed doses of 95 to 816 billions of viable paratyphoid organisms taken from agar cultures.

The monkeys showed symptoms of illness, such as sluggishness, loss of appetite, diarrhea, and some loss of weight. In no case would death occur, and the organisms were not isolated from the blood although daily attempts at blood cultures were made.

One strain of *B. aertrycke*, originally isolated in a food poisoning outbreak in New York City, and found to produce no symptoms when heat-killed cultures were fed to man, monkeys, and other animals, was suspended in saline solution, and the suspension divided into two equal portions, one portion being boiled for 20 minutes before being fed.

Symptoms of food poisoning appeared in animals fed with living cells, not in the others. Similar positive results were obtained with an enteritidis strain, but monkeys fed with living proteus and coli strains showed no signs of illness.

In two instances monkeys in which food poisoning had been produced were fed again with the same strains three weeks later, and for the second time developed typical symptoms.—G. M. Dack, E. O. Jordan and W. L. Wood, *Proc. Soc. Exper. Biol. & Med.*, 26: 301 (Jan.), 1929.

Quantitative Studies of Responses to Different Intakes of Vitamin D—Reference is made to two recent experiments with reference to the adequacy of animal experimentation in showing the quantitative effects of vitamin D. In the work reported a diet was used containing sufficient vitamin A to make normal growth and sufficient calcium while vitamin D is abundant. Young rats were used, separated from their mothers at 21 days and 28 days. At 28 days rats were used in 3 experimental periods—28th to 56th day, 52d to 80th day, and 110th to 166th day. The 21-day rats were used in periods, 21st to 56th day, and 52d to 80th day.

Weekly determinations were made and at the end of the period femurs were dissected and ash and calcium determined.

All the criterions used in other experiments were employed here—percentage of ash, or of calcium in fresh bone, ash or calcium in the alcohol-ether extracted bone, ratio of ash to organic residue of the bone. In the experiments graded allowances of whole milk powder resulted in an increased deposit of cal-

cium in femurs, both from the time of separation to the 56th day of age, and from the 52d to the 80th day of age.

Supplementing 8 to 9 per cent of the calories with whole milk powder resulted in practically normal calcification. Similar calcification occurred with a 5 per cent of the calories supplement in from 21 to 56 days.

About 300 rats were used in this experiment and parallel results were obtained in all series, demonstrating that cow's milk contains important amounts of vitamin D. Calcium deposit of the femurs is found to be more in proportion to the supplements of vitamin D than are the weight gains.

The authors conclude that this is a definite criterion in determining proportions of vitamin D in food and that experiments have shown the advantage of such experiments upon rats immediately after separation from their mothers.—H. C. Sherman and H. K. Stieberling, *J. Biol. Chem.*, 83: 497 (Sept.), 1929.

CHILD HYGIENE

MERRILL E. CHAMPION, M. D.

A NATIONAL MATERNITY SERVICE

No one is listened to with more respect, in any discussion of maternal and infant mortality, than is Dame Janet Campbell of England. The following quotation from the foreign letter page of the *Journal of the American Medical Association* offers food for thought. All probably will agree with the statements of fact in the report; some will draw back from the connotations of "subsidy," especially if of governmental origin:

Dame Janet Campbell, senior medical officer for maternity and child welfare at the ministry of health, in her official report, declares that, out of 1,083 infantile deaths investigated, 774 of the children were either born dead or died during the first month of life, and that unless and until good midwifery, in its widest sense, is available for all mothers, many lives that might be saved will continue to be lost. Midwifery in working class homes, she adds, cannot be properly carried out unless it is subsidized in some way. Much has already been done, but not enough. Suggested remedies include a national maternity service, such as that recently proposed by the British Medical Association. Dame Janet Campbell made the investigations as the English part of an international inquiry instituted by the League of Nations. "We are sometimes inclined to think," she writes, "that the present machinery for supervising infant health and welfare is relatively complete and satisfactory. An inquiry of this kind brings home to us forcibly how much yet remains to be done before it can be said with truth that the pregnant woman and the young infant are receiving all the support and all the assistance due them from the community if the children of the nation are to multiply and prosper." After urging the necessity for improving the general sanitary environment, and particularly the housing, she also suggests as measures to secure a further reduction in the infant death rate:

1. A well organized maternity service available for every woman who cannot afford to provide adequate facilities for herself, including: (*a*) effective prenatal supervision; (*b*) adequate attendance at childbirth by well trained and competent physicians and midwives; (*c*) hospital provision for all abnormal or complicated cases, and (*d*) whatever supplementary assistance may be required before, during or after childbirth with a view to protecting and safeguarding the health of mother and child.

2. The extension and development of home visiting and infant welfare centers so that these may be fully available for all mothers, with a view to the better education of the mother and the protection of the child from avoidable disease or infection.

3. A domiciliary nursing service for minor and major infantile maladies.

4. An increase in hospital accommodation for infants who cannot properly be nursed at home.—

Foreign Letter, *J. A. M. A.*, Oct. 12, 1929, p. 1157.

HEART DISEASE A PUBLIC HEALTH PROBLEM

One of the decisions which will have to be made soon by public health workers is: How far is it wise to go in including among public health problems such matters as heart, kidney and joint affections, cancer, etc. Common sense would seem to rule out of this field the treatment of any of these diseases. How far can we successfully prevent them? The case for heart disease is well set forth by Dr. Taliaferro Clark in the article, "Heart Disease a Public Health Problem."

Pointing out that it is unfortunate that disease conditions developing slowly seldom receive adequate recognition, Clark goes on to state that "practically 75 per cent of all cases of heart disease develop in children under 10 years of age, as compared with about 12 per cent in persons over 40 years of age." Heart disease was the third highest in the list of causes of death of children during the period of 1921–1927 in the registration area of 1920.

For the prevention of congenital heart disease we must rely upon prenatal care —with what hope of success, who can say? Acquired heart disease, on the other hand, offers a more hopeful opportunity based upon hygiene and the prevention of infections, particularly rheumatism and tonsillitis. Incriminating evidence is found in the association of certain infections with damaged hearts—tonsillitis, according to Clark, leading with 66 per cent of the cases; rheumatism in 44 per cent; diphtheria in 16 per cent; chorea in 15 per cent; and scarlet fever in 12 per cent of the cases. Faulty hygiene conduces to degenerative changes in the heart muscle. Decayed teeth are now definitely under suspicion. Figures are quoted to show the sinister relationship between tonsils on the one hand and rheumatism and heart disease on the other. In such cases the indications for prevention are clear.

From the practical point of view of getting something done through administrative action, it is pointed out that adequate school health supervision is important. Stress is rightly laid upon the value of the school nurse's follow-up work in the home. Part of the article is devoted to the treatment of the cardiac case.—Taliaferro Clark, M.D., Heart Disease a Public Health Problem, *Pub. Health Rep.*, Oct. 11, 1929.

RURAL SCHOOL DENTISTRY IN NEW ZEALAND

Dental hygiene, because of the fact that dental defects bulk largest among the physical defects of school children, rightfully may claim a place in the forefront of any discussion of child hygiene.

Two items are appended, the first relating to the United States and the second to the other side of the world. We will hear first from New Zealand:

Consideration is being given by the minister for education in the dominion to the establishment of traveling dental clinics to provide for the needs of rural school children. Some years ago there was such a clinic operating in the rural districts of Auckland board area, but the department of health had stopped the arrangement on the score of expense.

Stimulated by the good results of the rural dental service provided in Queensland, the health department has reopened the question, but the expense still remains a problem. The department maintains that the service is impracticable because of its cost. In some areas, a modified service has been provided whereby a dentist employed by the department goes from school to school, making a small charge for the treatment required. Dental nurses are being more extensively employed to carry out preliminary surveys, and to refer

those needing treatment to a school dentist working at a central point for the area.

The education department has ruled that dental treatment shall be as far as possible made available to the pupils of the registered private schools as well as to those attending the free schools conducted by the government.—Foreign Letter, *J. A. M. A.*, Sept. 7, 1929.

The second item deals with a state dental program in Tennessee. It will be carried out by the state and county health departments and has the endorsement of the state dental association. Provision is to be made for county dental units, beginning with those counties having a full-time health department. The service will consist of a thorough dental examination, with treatment offered children of the fourth grade and below who cannot go to a private dentist. A nominal fee of 50 cents will be charged for each filling or extraction. A further service will be instruction in the care of the teeth. The parents will of course be notified of the findings brought out by the examinations. The state and the county will share the expense of the county unit, a minimum of $500 being put up by each.—Public Health Dental Program, Tennessee, *Child Welfare News Summary*, Oct. 19, 1929.

Two or three comments on the above items of news come naturally to mind. New Zealand is evidently worried by the cost of such service—rightly enough—and is trying to get around the difficulty by charging a fee, presumably only part of the cost. In other words, they are trying to straddle the fence between free health service for all and self-supporting service. Again, the government is offering this service to private as well as to public schools, a course open to serious objections.

Tennessee, like New Zealand, is embarking on "state medicine" (be that good or bad) in offering surgical treatment wholly or in part at public expense. One wonders about "nominal fees." Why not have everyone pay all that he can afford (a sliding scale) or else nothing at all (if the service is one that the taxpayer is supposed to be entitled to)? Nominal fees are often only soothing syrup for an uneasy governmental conscience which senses the dangers of pauperization, but not keenly enough to take effective measure against it.

PUBLIC HEALTH NURSING

EVA F. MACDOUGALL, R. N.*

Qualifications for Rural Public Health Nurses—In preparing her paper entitled "What Preparation Should the Public Health Nurse Have for Rural Work?" read before the Public Health Nursing Section of the American Public Health Association at the Fifty-eighth Annual Meeting at Minneapolis, October 4, 1929, I. Malinde Havey, R.N., of the American Red Cross Washington, D. C., sent questionnaires out to State Directors of Public Health Nursing and Red Cross Nursing Field Representatives and others who had many contacts with rural nurses, asking them to state which of a given list of factors they considered most valuable, in the order of their importance, to a rural public health nurse. Here are the results:

1. Good physical and mental health
2. At least 4 months at one of the university public health nursing courses graded and approved by the National Organization for Public Health Nursing
3. Graduation from a good nursing school
4. Good home bringing up
5. Experience in county nursing under supervision
6. High school education
7. Good personal grooming

The League Calendar for 1930—This year the National League of Nursing Education calendar presents pictures of the old and new in nursing . . . "pictures of temples of healing, ancient and modern, of the transportation of the sick as it was once done and as it is done today, of early teaching and teaching nowadays."

Every nurse will want to own one of these calendars and she will find that they make acceptable gifts for her friends. The price of the calendar is $1.00 per single copy, 75 cents per copy on all orders of 50 or over, delivered in one shipment.

Proceeds of the sale will be used to help maintain and develop the activities of the National League of Nursing Education.—Nursing and Nurses, Ancient and Modern. National League of Nursing Education, 370 Seventh Avenue, New York, N. Y.

A New Pamphlet for Red Cross Public Health Nurses—A new pamphlet just published by the American Red Cross will prove very useful to nurses doing any kind of public health nursing work.

The Advisory Committee on the Health Program of the American Red Cross has laid down the following principles for the conduct of public health nursing activities:

1. The nursing of patients shall be carried on only under the direction of a licensed physician.

2. In advising relative to securing medical or surgical treatment, the Red Cross does not choose between individual licensed practitioners. Such choice must be left to the individual patient or to his family.

3. The Red Cross advises with reference to securing special medical and surgical treatment only after consultation with the physician, where one is available.

Chapters which employ public health nurses should request the medical society, or the local physicians as a group, to endorse standing orders which the nurse should follow in giving nursing care on her first visit to a patient, if the patient has no doctor or if the nurse cannot get in touch with the patient's doctor.

* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 126 State House Annex, Indianapolis, Ind.

It is understood that such orders do not authorize a nurse to continue giving nursing care after the first visit if there is no doctor in charge, and that the nurse will make every effort to get in touch with the doctor in order to secure his specific instruction in person.

In accordance with these principles every Red Cross public health nursing service should try to obtain standing orders from the local medical society or from the Chapter Medical Advisory Committee until such time as the medical society is ready to authorize them. The need for such orders is obvious.

The need of standing orders from the medical society for general, emergency and school use is explained.

Oftentimes when a chapter goes to the medical society to request a set of standing orders for the public health nursing service, the medical society does not understand just what is wanted, so a sample set of standing orders is given, a great deal of which is copied from the *Manual of Public Health Nursing*.*

In the part on "Bag Technique" the pamphlet goes on to say:

A careful and systematic procedure in the use of her bag and its equipment is a sign of a well trained nurse who respects the scientific nature of her work and takes pride and pleasure in a flawless and skillful technique. The American Red Cross expects every member of the Red Cross Public Health Nursing Service to use good "bag technique," as this procedure is commonly called.

Aside from the pleasure one takes in one's professional skill, there are three important reasons for the use of a scrupulously exact technique: one, to maintain safety, that is, to prevent the spread of disease from one patient to another and from patient to nurse; two, to expedite the work; a simple technique routinely used soon becomes a habit which frees the mind for other matters, speeds up the work, prevents confusion and saves the patient much nervous fatigue; three, to help in teaching the family; nothing is more impressive than skillful technique in teaching the family cleanliness, sickroom care and the ease of working systematically.

Sample technics are also given for various public health nursing procedures, again often quoting from the *Manual*. In the part on "Nursing Equipment" we quote the following:

Every Red Cross Public Health Nurse is expected to Carry a Bag Appropriate to and Properly Equipped for Her Work. The bag and its equipment are the tools of her art without which the nurse is greatly hindered in meeting technical standards. While the initial outlay required for their purchase may seem somewhat expensive to the Chapter it may be accepted as essential to the quality and effectiveness of the service. Any one of three standard bags is recommended for the use of Red Cross public health nurses according to the kind of work in which each nurse is engaged.

These are (1) the Stanley Visiting Nurse's Bag which is particularly adapted for use in visiting nursing; (2) the Stanley School Nurse's Bag designed for use in town school nursing but which also can be used for a limited amount of bedside nursing, and (3) the Red Cross County Nurse's Bag designed for use in county work which includes school nursing and other educational work, and also some emergency bedside nursing.

Further on in speaking about the contents of the nursing bag the pamphlet states:

The Bag Shall Contain no Other Drugs Than Those Which the Nurse Has Been Authorized to Use by the Local Medical Society or the Chapter Medical Advisory Committee and Which Are Covered by Standing Orders. This does not apply, however, to liquid green soap, alcohol, Lysol, vaseline and hand lotion which may be carried without an order.

Since the American Red Cross is in intimate touch with such a large number of public health nursing services of all kinds all over the country and is constantly working to improve them, this pamphlet is very practical and up-to-date and can very well be followed by every public health nurse whether she is paid by Red Cross funds or not.—*Standing Orders, Bag Technique and Nursing Equipment for American Red Cross Public Health Nurses, A. R. C. 721,* The American Red Cross, Washington, D. C., Sept., 1929.

* Published by the N. O. P. H. N., and for sale by the A. P. H. A., Book Service.

EDUCATION AND PUBLICITY

EVART G. ROUTZAHN*

Staff Members as Members—The Public Health Education Section of the A. P. H. A. is the one professional organization of all who are doing any phase of public health education. It is the place to stand up and be counted. Executives are urged to encourage membership for all staff members doing anything in education and publicity. Cannot the department or organization provide the individual memberships?

At Your Next Convention—At the next state meeting of social workers, or any state or national meeting of health workers, let's have a health education and publicity session Breakfast, luncheon or informal dinner?

If you have no other idea for a program, offer "Questions and Answers." Invite questions in advance. Have your questions written out ready to start the meeting. The audience will quickly supply more questions. The chairman can answer some questions and get the audience to help. A committee of two or three could help the chairman handle the questions.

Merely opinion questions could be answered by raising hands. How many believe so and so? How many believe something else?

Try It on Yourself—Mail a poster or car card to your own home address. Take it out from the tube—if you can get it out without tearing the poster or tearing the tube into bits. Then try to hang the poster or card on the wall. Can you keep the top and bottom flat against the wall? Surely not, because the office rolled the printed side inside. *Every rolled poster or card received for the Minneapolis headquarters display was a problem, because the roll was too tight, or because the roll was crushed, or because the printed side was rolled inside.* Try it on yourself to learn how your office handles such shipments.

Classified Health Material—A group of portfolios displayed at publicity-education headquarters at Minneapolis contained samples of material issued by health agencies on heart disease, cancer, colds, rural sanitation, diet and weight, health examinations, winter warnings and advice, summer warnings and advice. Other portfolios contained radio talks, house organs, booklets and folders. Thus was realized the classified portfolio idea we have been seeking for a year or two. The gay labels on the portfolios were lettered by Merwin-Davis, 144 East 86th St., New York, N. Y.

The portfolios have been loaned to the Community Chest, Washington, D. C. To borrow them you pay express charges. Weight 11 pounds.

"Baby-Mother Books" Are Better and Better—A group of such pamphlets and folders on the needs of mothers or babies were received in advance of the Minneapolis meeting. Text, typography and paper are improving. There seems to be too much shiny paper, lessening readability of several folders or booklets. One state department is using too small type. One folder, *Sun Baths,* omits all men-

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

tion of the publisher. Why is this, please?

The collection came from the following: Department of Health, Buffalo; Iowa Tuberculosis Association, Des Moines, Ia.; John Hancock Mutual Life Insurance Co., Boston, Mass.; Ohio Department of Health, Columbus, O.; Pilot Life Insurance Co., Greensboro, N. C.; U. S. Children's Bureau, Washington, D. C.; Wisconsin Anti-Tuberculosis Association, Milwaukee, Wis.; and one unknown source.

And That Was Minneapolis—Some education-publicity workers turned up for the first time. . . . But we missed others who should have been there. . . . Our headquarters was arranged along new lines which seemed to meet with general approval. . . . We hope to make even more classified selections of publicity materials next year. . . . Diphtheria held its own with 75 at a hastily called breakfast and many visitors to the diphtheria section of our headquarters, again in charge of Mrs. Marie Kirwan, State Charities Aid Association, New York, N. Y. . . . "It" and the contest mentioned elsewhere aroused much discussion. . . . What can we offer for critical examination next year? . . . Here is the first call for volunteers as reporters for the *Daily Bulletin* at Fort Worth. . . . Now we are more than ever sure that the annual meeting is not the time for holding a local popular health exhibition. . . . And that the technical exhibits from health departments and associations should be grouped together. . . . And that the exhibits or consultation desks of national health agencies should not be scattered among the commercial exhibits. . . . And that it would be good to have more technical exhibits and more consultation desks from national agencies. . . . As usual, the milk and cleanliness groups put on pleasing and effective displays. . . . The opinion voting on exhibits was a flop with but three ballots turned in. . . . Those who ask every year that exhibits should be criticised had their chance and passed it up. . . . What kinds of publicity and educational materials would you like to see at Fort Worth?

For and Against "It"—The booklet for girls, "It" And How, already discussed in this department was the subject of a contest at the A. P. H. A. meeting in Minneapolis. The Minnesota Public Health Association, 11 West Summit Ave., St. Paul, Minn., publisher of the booklet, offered prizes for the 5 best favorable comments, and the 5 best unfavorable comments.

None of the unfavorable comments were signed. The favorable prize winners were: M. Wolff, Minneapolis, Minn.; C. P. Archer, Moorhead, Minn.; L. von D. Chandler, Hackensack, N. J.; J. H. Larson, New York, N. Y.; Orpha Hocking, Minneapolis, Minn.

The majority of the voters thought that girls would read the booklet; that the "It" appeal is not unwholesome; and that it would influence the health habits of girls. The voters stood about half and half on this question: "Are health workers past their teens good judges of what will appeal to teen-agers of today?" Single copies of the booklet for 10 cents at the St. Paul address.

From Iceland to Siam—Dr. Rene Sand, technical counsellor, League of Red Cross Societies, says:

> From Iceland to Siam, from Dantzig to South Africa, from Canada to Chile and New Zealand, there is not a single Red Cross Society which is not endeavouring to teach the masses the elementary rules of hygiene and child welfare, instructing them in the means of checking social scourges. Tracts, brochures, posters, calendars, illustrated post-cards, press articles, children's books, bulletins, lectures, cinematograph demonstrations, traveling teams,

wireless talks, models, exhibitions, playlets, pageants, competitions, health weeks, children's weeks and cleanliness weeks—all possible means are employed, even to the advice which the Argentine Red Cross has printed on match boxes. And the above does not take into account the work accomplished by the Junior Red Cross or by public health nurses. Hygiene articles are increasing in number in the National Red Cross bulletins; some of the Societies are even publishing special reviews devoted exclusively to health questions, such as "Hygia," published by the Greek Red Cross.—

World's Health.

What the States Are Doing—Or Not Doing—The record is for 1925, but in one instance at least there is less doing now than in the year covered by the Rockefeller report of health departments and provinces of the United States and Canada.

Here are a few high lights from the section on Public Health Education:

Organization—The state departments of health of 17 states have a separate bureau or division in charge of educational activities, while 22 states conduct the work in the executive or central administrative office. The work is in charge of the division of child hygiene in Louisiana and Texas, the division of hygiene in Massachusetts, and is divided between the divisions of child hygiene and venereal disease control in Minnesota. In Alabama, Delaware, Missouri, and New Hampshire the head of each division is responsible for promoting the educational and publicity activities of his division. Idaho does not carry on any special educational work.

Publicity—In 10 states the director of the bureau or division of public health education is also responsible for publicity, in 27 states the executive officer himself handles publicity, and in Louisiana and Massachusetts the director of the division of child welfare handles it. In Alabama, Delaware, Kansas, and New Hampshire the head of each bureau or division gives out news regarding his division. Kentucky employs a publicity reporter, Maine designates a special clerk, and Virginia employs an experienced newspaper man. The activities of Florida and Idaho are reported as quite limited.

Educational Methods—In general, the educational program of the various states provides for publicity through articles on health subjects in newspapers, magazines, bulletins, and pamphlets, and through lectures, motion pictures, and exhibits on special subjects.

Press Service—Seventeen states maintain regular newspaper service, 27 states coöperate with the local newspapers by submitting news and other articles on health subjects from time to time and 4 states report that they do not have any press service.

Each week the Illinois State Department of Health mails a 300-word story and a page of pointed paragraphs to every newspaper in the state. Pennsylvania syndicates a weekly health letter to 300 newspapers, Texas to 450 newspapers, and Virginia to 145 papers. In West Virginia once a month a column of plate is sent to the country weeklies. At the time this material is released by the country weeklies it is sent to the city dailies as "Newsgrams."

Illustrated feature stories for the Sunday papers are prepared by the bureau of public health education in West Virginia.

Special Methods of Publicity—In recent years broadcasting has become popular and state departments of health are using this method of stimulating public interest in health education. The following states reported radio talks during 1925: Connecticut, Illinois, Iowa, Maine, Missouri, New York, Pennsylvania, Tennessee, and Vermont.

Bulletins—Thirty-five state health departments publish periodical bulletins which are issued weekly, bimonthly, monthly, quarterly, or semiannually. Six additional states published pamphlets on particular subjects, and 7 state departments of health did not publish any bulletins or pamphlets in 1925. Of the 35 states issuing a regular bulletin 27 also published pamphlets on special health subjects during 1925.

Graphic Material—Thirty-eight states own motion-picture films and many of these states have projecting machines also. (The number of states having motion-picture machines is not available.) Portable exhibits on various health subjects are used by 36 of the states.

Health trucks are used in Arkansas, Florida, Mississippi, New York, Ohio, and Virginia for the benefit of the rural population. These trucks are equipped with dynamo, moving-picture projector, etc. Portable exhibits are also transported to rural districts by these trucks.

Special Exhibits—Louisiana uses portable electrical models to demonstrate various health subjects. New York has wax models which are used by the division of venereal disease control. Wisconsin has a set of large hand-painted panels in pictorial and chart form to outline the board's varied functions and activities. One set describes the latest

procedures in the control of communicable diseases, such as toxin-antitoxin vaccination and goiter prevention; another set is devoted to the work of the sanitary engineering and plumbing divisions; and another to venereal disease prevention and social hygiene. A staff artist is employed for this work.

—Pp. 118–122, in *Health Departments of States and Provinces of the United States and Canada.* U. S. Public Health Service. (*Pub. Health Bull.* 184.)

What in this report cheers your heart?

Good Statistical Leads—Effective use of statistics in news stories is illustrated by many of the weekly press releases of the Illinois Department of Public Health.

Springfield, July 30: Instead of being stretched to greater length the life span of adults is being cut short. Mortality rates among people past 40 have increased about 10 per cent in 10 years. The percentage of all dealths in Illinois, occurring among people between 45 and 65 years, has increased from about 20 per cent in 1918 and 22½ per cent in 1920, to 27 per cent in 1927.

These statements were made here today by Dr. Andy Hall, state health director, who pointed out that the increase in average life span during recent years has resulted entirely from saving children and reducing infant mortality. Adults and especially those past 40 are actually losing ground in life expectancy compared with the situation a decade ago. . . .

Springfield, Sept. 12: Only 1 out of each 200 mothers who gave birth to children last year in Illinois failed to survive the experience, according to a statement issued here today by Dr. Andy Hall, state health director, who declared that this is the most favorable maternal mortality record ever made in the state. At the same time, Dr. Hall added, 2 out of each 3 of those who died succumbed to causes of a preventable nature. . . .

Springfield, Sept. 18: In spite of eighteen-day diet fads and the popularity of golf, a rise of 15 per cent in the mortality from diabetes last year shows that people in general are eating too much and exercising too little, according to a statement issued here today by Dr. Andy Hall, state health director. Last year 1,750 people succumbed to diabetes in Illinois, compared with 1,484 in 1928, and 1,025 in 1919, the lean war year. This increase of 70 per cent in eight years is almost exactly parallel to the rise in general post-war prosperity which has been accompanied by an unprecedented increase in rich food consumption. . . .

Springfield, Sept. 25: Accidents and tuberculosis are far and away the worst health hazards that school children have to face, accidents predominating among the grade pupils and tuberculosis among high school students. These facts were disclosed here today by Dr. Andy Hall, state health director, who pointed out that accidents and tuberculosis were responsible for 31 per cent of 4,772 deaths that occurred in Illinois last year among children between 5 and 20 years old. . .

Springfield, Oct. 23: With heart disease outdoing all other ills on the mortality calendar and the death rate from this cause in Chicago standing nearly 20 per cent above that of down-state, Dr. Andy Hall, state health director, declared in a bulletin issued here today that industry and employees generally must take a vigorous hand in a control program if the tremendous and increasing economic losses caused by cardiac disorders are to be lessened or prevented in significant degree. Nearly all of the thousands of cardiac patients can earn a substantial livelihood provided they are occupied in suitable jobs, it was pointed out. . . .

Springfield, Oct. 30: With more than 200 cases of smallpox reported from 27 different counties within the last 6 weeks, and two outbreaks of more than 30 cases each within the last 2 weeks Dr. Andy Hall, state health director, declared in a statement issued here today that the outlook for the next few months is most unpromising. While the disease is generally mild in character the quarantine period is a strict 21 days for every patient and the numerous foci are likely to result in spreading that will cause serious losses to business, especially during the holiday season. . . .

In every case the lead is followed by an interview amplifying and discussing the statistical statement. A second sheet, headed "Health Grams," carries 8 or 10 well written "filler" paragraphs. For example:

Facts are our scarcest raw material according to Owen D. Young, who might have added that careless information masquerading as facts is our most plentiful stock in trade. If the claims of nostrum vendors and short cut cure experts were true we should soon all be supermen, and nobody would have cancer, tuberculosis or "that tired feeling."

Complete copies of above news releases, *free* on request.

MOTION PICTURES

Health Movies: How to Use Them, by H. E. Kleinschmidt, M.D. National Tuberculosis Assn., 370 7th Ave., New York, N. Y. *Free.* 7 mimeographed pages. "Difficulties to be Hurdled," "Types of Health Movies," "Shall the Motion Picture be Explained?" "A Word about Trailers," "Mechanics of Making Movies," etc.

"Sound Studio Slang," by Frank J. Wilstach. *New York Times.* Oct. 13 and 20, 1929. New words used in recording films.

Says the American Posture League: "A posture film is now in the making and will be issued by the Eastman Teaching Films of Rochester within the next few months." The League cooperated in the preparation of this film.

"Statistically Speaking—A Flagrant Misinterpretation," by E. R. Enlow. *Educational Screen,* 5 South Wabash Ave., Chicago, Ill., Oct., 1929. 25 cents. For those who may be tempted to quote over-enthusiastic statements as to the teaching values of motion pictures based in the Eastman experiments.

Universal Cinema Co., Indianapolis, Ind., announces collaboration with the U. S. Public Health Service in the production of pictures on mosquito control and malaria presentation: how airplanes, motor boats and other means are used; better and cheaper ways of mosquito-proofing houses; life cycle of the mosquito; and a variety of methods of control will be shown.

Sunshine from the Sea, issued by E. R. Squibb and Sons, 80 Beekman St., New York, N. Y., is "the story of two vitamins in their relation to health and beauty." Uses some color photography and animated diagrams. The synopsis sounds popular, with up-to-date scientific data.

How Science Aids in the Control of Infectious Disease, by Squibbs, illustrates immunity preparations and how they work.

It seems probable that both the above pictures will be useful for showings to health and social workers.

"1000 and One—The Blue Book of Non-Theatrical Films" (6th ed.). *Educational Screen,* 5 South Wabash Ave., Chicago, Ill. *75 cents.* Classified lists of pictures with distributors. Includes Physiology, Health, Hygiene, Child Hygiene, Nursing, Accident Prevention, Athletics, etc.

"Theatre Building and Equipment Buyers Guide." Supplement to *Motion Picture News,* 729 7th Ave., New York, N. Y. Detailed classification of equipment sources.

"Teaching Film Showing Intestinal Movement." *Trained Nurse,* June, 1929. Synopsis of new picture prepared at University of Chicago.

"This Great Peril," produced by Visugraphic Pictures, Inc., "carries home to the layman the warning that he must use the proper method to cope with the cancer menace and, above all, must guard against quack practices." Synopsis in *Campaign Notes.* American Society for Control of Cancer, 25 West 43d St., New York, N. Y., June, 1929. *Free.*

NEW PERIODICALS

The mid-monthly edition of *The Survey* has been so made over—and improved—that it is almost a new magazine.

Municipal Sanitation, edited by Abel Wolman, Maryland State Board of Health, to start publication January 1.

BOOKS AND REPORTS

Clinical Laboratory Methods—*By Russell Landram Haden, M.D. (3d ed.). St. Louis: Mosby,* 1929. 69 ill. 4 col. pls. 317 pp. Price, $5.00.

This book is a selection from standard reference books on laboratory methods of those determinations which are most commonly done in the clinical laboratory. In most cases only one method for each determination is given, this method being the one most commonly used at present. The subjects covered include clinical chemistry, bacteriology, hemotology, serology, clinical pathology, and short sections on tissue preparation and water and milk. Basal metabolism has been entirely omitted.

The most important addition to the present edition is the Kahn precipitation test which together with the Kolmer method for the Wassermann test comprises the section on serology.

A few other new methods such as the determination of indican in blood have been added.

With most of the quantitative chemical methods, tables are given from which the final results can be taken without calculations. An excellent section on preparation of solutions, standardizing of glassware and chemical methods is included. C. C. YOUNG

Archiv für Rassen- u. Gesellschafts-Biologie, einschliesslich Rassen- u. Gesellschafts-Hygiene—*v. 21, Heft 3. München: Lehmanns Verlag,* 1929. Price, M. 6.

This well known German journal under the able editorship of Dr. A. Ploetz and Dr. Fritz Lenz of Munich with a group of collaborators is the organ of the German Society of Racial Hygiene. It concerns itself with problems of human heredity, eugenics, and euthenics, with the emphasis upon the biological approach to the various phases of the subject. The issue on hand contains Dr. Lenz's critical discussion of Burgendörfer's statistical analysis of the decline of the birth rate in Germany, an article by Dr. H. H. Laughlin on the history of legal sterilization of defectives in the United States, a statistical study by Dr. Gschwendtner, by the questionnaire method, of the motives favoring and hindering child bearing in Austria, and a study of musical talent as shown by use of the violin in sixteen peasant families. There are also news items and critical reviews of current literature. C. A. KOFOID

At Home Among the Atoms. *A First Volume of Candid Chemistry—By James Kendall, Sc.D., F.R.S. New York: Century,* 1929. 318 pp. Price, $3.00.

Here is a popular book which develops, with essentially the same system and sequence as ordinarily used in good texts, the field covered by an introductory course in the science of chemistry. Certainly it would not serve for a text for such a course, and the author makes it very clear that the book "has not been written for the scientific expert," and is "not even intended to serve . . . as a text book for beginning students." It is far too highly diluted for such a purpose, though the diluent is seldom extraneous.

The book is written for that part of the public whose desire is "not merely to know but also to understand," and it is the sincere feeling of the reviewer

that a comprehension of this book will furnish a fundamental understanding of chemistry as a science. One should not expect it to bring a full grasp of that science. Non-chemists should not expect to learn chemistry through its perusal, though it may inspire many to read further. Chemists should be able to spend a very enjoyable, and in many cases, profitable, evening with the book, as it is delightfully written, and one cannot but feel that one's enjoyment in reading it was fully shared by the author in writing it. This personal interest on the part of the author in his presentation has resulted in a greater precision in presenting many phases than one finds in many popular treatments.

ALLEN E. STEARN

The History of a Crime Against the Food Law. *The Amazing Story of the National Food and Drugs Law Intended to Protect the Health of the People. Perverted to Protect Adulteration of Foods and Drugs—By Harvey W. Wiley, M.D. Washington: Harvey W. Wiley,* 1929. 413 pp. Price, $2.00.

The story of the fight which has been waged for the protection of the public against adulterated and unfit foodstuffs is not a pleasant one. Politics has often played a larger part than a consideration of the welfare of the public. While some adulterations have only a commercial and not a public health interest, none the less the people should be protected against them.

No single person has played a larger part in the struggle for pure foods than the author of this book. He has been in, and a part of, the struggle from the beginning. His so-called "Poison Squad" attracted wide attention, and was the means of making many people think for the first time of the quality of the foods they were buying and eating.

In the volume before us, Dr. Wiley has given a chronological account of what has taken place in governmental circles and shown up the various influences which have played so large a part in defeating the administration of the Food and Drugs Law. The book is thoroughly documented, and contains many quotations of hearings, reports, resolutions, etc. Fortunately there have always been a certain number of persons fighting on the right side, but they were often handicapped by official inaction or opposition.

The book tells the story of which no American has reason to be proud. We believe that Dr. Wiley deserves great credit for collecting in a convenient form the mass of material scattered through various governmental documents. The importance of the study of nutrition and foods is now recognized as never before. The struggle for pure foods and proper foods is by no means over. Sophistication of all kinds is still practiced. Adulterants, coloring matter, bleaching processes, etc., are still tremendously used, and probably will be until human nature becomes regenerated. The desire for gain still overshadows often the welfare of the people.

The printing and make-up of the book are good. A number of illustrations are given. As a believer in the historical method of teaching we commend this book to all students of nutrition, and to the medical profession in general, as well as to the public.

M. P. RAVENEL

You and the Doctor—*By John B. Hawes, 2d. Boston: Houghton, Mifflin,* 1929. 181 pp. Price, $2.00.

This book by Dr. Hawes has "punch" to it, holds the interest, and, best of all, offers advice that is sound and easily understood by the layman.

It takes courage to begin a book as Dr. Hawes has done by a discussion of

medical ethics. The risk is run of irritating both doctor and patient. The author by his sincere handling puts the subject on the plane of common sense. What might be termed the specialist's point of view is kept for the most part pretty well in the background. His touchstone is: The patient comes first.

A chapter on medical economics takes up the subjects of cost of sickness; physicians' fees; how to choose a good physician; and treatment by a specialist. The handling is frank—quite the best we have seen. The part dealing with specialists' fees may seem unconvincing to some.

Following these more general matters the author gets down to a discussion of symptoms, what they may mean and what to do in case you have any of them. Headache; pain in chest and abdomen; backache; tumors; hemorrhage; coughs and colds; rheumatism and neuritis; constipation; "kidney trouble"; are treated of in language which the intelligent layman can readily understand. A very good chapter is that on "Nerves"; another is the one on "Vacations." The "Family Medicine Chest" that Dr. Hawes allows has somewhat more in it than some physicians would agree to, perhaps, but a good reason is given for the inclusion of the various articles.

The keynote of this book may be said to be the frankness and honesty which the author emphasizes in the last chapter—"Doctor and Patient"—as being essential in the relations of a patient to his physician.

MERRILL E. CHAMPION

The Modern Baby Book and Child Development Record—*By John E. Anderson and Florence L. Goodenough. New York: Norton,* 1929. 398 pp. Price, $5.00.

The publishers say: "Here is a modern baby book combining the sentimental features of the conventional baby book and scientific records. The records are easy to keep and will enable you to compare your child's development with the 'average' child."

These statements are comparatively true. This is a big book, with much space for data and tests and answers to questions for ages up to 16 years, which will show a child's comparative development, and be interesting to the mother, and perhaps, later, to the subject. At the same time she is making comparisons with the author's ideas of a normal child, and so gauging her own child's progress.

However, it is *not* too easy to keep up and the effort required is possessed by many, but not all of even intelligent modern mothers.

The reviewer cordially recommends the book. W. D. LUDLUM

The Prevention of Human Tuberculosis of Bovine Origin—*By William G. Savage, M.D. (London), D.P.H. London: Macmillan,* 1929. 195 pp. Price, $4.25.

Bovine tuberculosis is a more serious, more unyielding problem in England than it is in the United States. An authentic picture of the extent of human tuberculosis of bovine origin is wanting, but the author has taken pains to examine many studies made in various places, as well as much circumstantial evidence, which leads him to assume that in Great Britain about 1 per cent of the respiratory, and 23 per cent of non-respiratory tuberculosis deaths in each year are of bovine origin. As to the number of bovine infections which do not terminate fatally, he dares not venture a guess.

The American method of dealing with bovine tuberculosis is not applicable in England, chiefly for the reason that in the United States positive reactors among cows range from 3 to 5 per cent, while in England the percentage is about ten times as great. To slaughter some

40 per cent of the dairy cattle would cause a milk famine and necessitate enormous compensation payments.

The possibility of eradicating the disease through some method of vaccination, as, for example, by the use of BCG, is full of interest, but at present holds out scant hope. There is an excellent description of Calmette's efforts to immunize cattle against tuberculosis. The method advocated by Bang, of Copenhagen, designed to bring about the rearing of herds free from tuberculosis, has apparently not resulted in the success hoped for. The practice of "designating" or certifying certain milks is a delusion. Pasteurization, while theoretically efficient, often fails lamentably in practice, as evidence of which he cites the experience of Montreal's recent epidemic of enteric fever, which was traced to milk supposed to have been pasteurized. The chief reason, however, why he is unwilling to rely on pasteurization is that its adoption would set back the steps now being taken to produce a cleaner milk, which seems reasonable in view of the wide extent of bovine tuberculosis and the haphazard, uncontrollable organization of the dairy business in England. Reliance on pasteurization alone is, to the author, a confession of failure.

The measures he advocates are based on the broad viewpoint that the problem must be solved by attacking bovine tuberculosis as a preventable disease and the campaign must be similar to that for the eradication of human tuberculosis. He recommends, in brief, the building up of the resistance of cattle by improving their environment, notoriously bad in England, and the prevention of infection from cow to cow by segregation and the immediate separation of newborn calves from their dams. He would not neglect the usual measures of keeping a vigilant eye on the milk supply as it reaches the consumer or the heat treatment of milk. That involves carefully coördinated administrative machinery, making possible frequent veterinary and bacteriological inspections, the compulsory notification of all cases, expert supervision of cattle that have general tuberculosis but no disease of the udder. If agriculturists are not prepared to coöperate actively to reduce the incidence of bovine tuberculosis, state aid in the form of indemnities and the cost of supervision will not be of sufficient moment to warrant the disturbance of existing practice, for only a slight reduction of human tuberculosis will result. Should dairymen obstruct the radical measures recommended, it will be better for the sanitarian to face the problem of preventing human infection in his own way—by controlling the milk supply as far as possible and establishing an adequate system of pasteurization—a confession of failure but the second best procedure.

The book is replete with tables and reports of research, technical information concerning the bacteriology and biology of tuberculosis and administrative procedures. The argumentative logic seems well knit together, though presumably the conclusions will not be generally accepted by American sanitarians as applicable to this country.

H. E. KLEINSCHMIDT

Hygiene of the Mouth and Teeth—*By Thaddeus P. Hyatt, D.D.S., F.A.C.D. Brooklyn: Brooklyn Dental Publishing Co.*, 1929. 64 pp. Price, $1.00.

This book of approximately 65 pages is written by the Assistant Medical Director of the Metropolitan Life Insurance Company. It is intended for general reading, and contains much useful advice on the care of the mouth and teeth, a subject which is constantly receiving more and more attention.

M. P. RAVENEL

Training Schools for Delinquent Girls—*By Margaret Reeves. New York: Russell Sage Foundation,* 1929. 455 pp. Price, $3.50.

It would be hazardous to estimate the value of this book in the field of delinquency. Certain values seem fairly clear. It gives us a perspective on the field as we have never had it before. It will provide legislators, boards and staffs with a source of information that will leave no excuse for continuing to create a permanent social liability while temporarily safeguarding society. It will provide suggestive material and analogies for those in other types of institution and other fields of social work.

The defects of this treatise are largely the defects of the field itself. One gets the feeling, despite obvious contrary attempts of the author, that the institution for delinquent girls is by itself. Perhaps this is due to the fact that the institutional life is not part of a larger program which is laid down before the girl reaches the institution, and of which the institution might be but rarely is a step in treatment. Usually the purpose in institutionalization is unburdening society of a problem, and it is left to the school to work out the plan after the first step in treatment is taken. To quote the author: "Ideally this study should have begun when the girl first entered the institution."

We raise the question—why not begin it before, so as to see if the institution is a proper step in treatment? Again the possibilities of an institution of this sort for conducting extramural work with non-institutional cases are not revealed. Surely the high grade staff advised would be of great value to those not requiring a new home. This all seems to relate to the fact that seldom is a treatment plan thought out and recorded.

Even in the suggestions for record keeping no provision is made for this most important step. If the record is thought of as the record of examinations, leading to a plan of treatment, we need not worry about its value as a check on the worker. There is also no indication of the mechanism whereby these various social, medical, and psychological examinations may be integrated.

Experience has shown that mere recording is not enough; some such instrument as the case conference is essential. This lack of integration is evident in the small extent to which the psychologist is brought into the school plan, whereas one of his greatest possibilities of contribution lies here.

The reviewer being primarily interested in the mental hygiene aspects of the book is hardly qualified to present a critical review of other features. The historical background is valuable in showing the evolution of the treatment of juvenile delinquents. The idea of constructing the institution around its functions is appealing. The chapter on psychological and psychiatric work is well said with the reservations above stated. One might take exception to the thought that these girls need to forget their sex experiences. The possibilities of making these experiences a value cannot be forgotten.

If one is looking for the trick which the schools use to turn the delinquent into an adjusted girl, he is bound to be disappointed. He reads in this book of things that might apply to any school or any home. If he is wise he might deduct from this the fact that the delinquent girl is not a different person requiring a different trick of education, but one requiring more careful attention to the principles of rearing that are applicable to any child. In the absence of a qualified home, school or society, the institution attempts to fill in the need. GEORGE S. STEVENSON

The Most Nearly Perfect Food—*By S. J. Crumbine, M.D., and James A. Tobey, Dr.P.H. Baltimore: Williams & Wilkins,* 1929. 292 pp. Price, $2.50.

The authors have prepared an interesting story of milk which is well printed and contains some 22 selected illustrations. While designed primarily for the lay reader, the book contains so many facts regarding the food value and the production and handling of milk and milk products of various kinds that it should prove useful for teachers and students of home economics, agriculture, dairy science, and public health.

Separate chapters deal with a balanced diet, a historical sketch regarding the use of milk, milk and the promotion of health, how to get clean and safe milk, and the use of milk and milk products. The reviewer is inclined to agree with the authors who state that, from our present knowledge, the main objective in milk production and control is the production of a maximum amount of milk from healthy non-reacting tuberculin tested cows under approved sanitary conditions, all of which, with the possible exception of certified milk, should be pasteurized. It should then be quickly cooled to from 45° to 50° F. and bottled in sterile containers. "Such milk is both wholesome and safe." IRA V. HISCOCK

Bacteriology of the Home—*By Ava L. Johnson. Peoria: Manual Arts Press,* 1929. 167 pp. Price, $2.25.

This book aims to present to students of home economics and to housewives those facts about bacteriology which can be put to practical use in the home. Such subjects as washing the hands, washing dishes, cleaning the house, refrigeration, canning of foods, and the care of milk, are discussed in detail. The text is made more attractive by many photographs of agar plates showing cultures taken from washed and unwashed hands, and foods and utensils under various conditions. To the casual observer these are quite convincing pictures, though only quantity of growth is shown, without any interpretation of the significance of the organisms. The book includes a laboratory guide which gives the procedure for the production of cultures of this type.

The author popularizes the axiom, "There are bacteria everywhere," and seems to dwell unnecessarily on the obvious. Little differentiation is made between pathogens and non-pathogens. The truth of such a statement as the following might be questioned, "Anything boiled in water twenty minutes is sterile." It seems outside the province of this book to voice an opinion on vaccination and the preparation of biologic products. Complete ignorance of the subject is demonstrated conclusively in the text. GRACE ELDERING

Human Nature and Management: *The Application of Psychology to Executive Leadership—By Ordway Tead. New York: McGraw-Hill,* 1929. 312 pp. Price, $3.50.

It should surprise no one if, after studying Mr. Tead's thorough-going treatise on the application of modern psychology to executive leadership, the executive tyro were to spend a few minutes in the outside office walking on his hands and brushing up on his defense mechanisms. For this eminently sensible specialist in the problems of personnel administration has given the beginner in the intricacies of human management a rather large order. If, having absorbed the theory of it, he succeeds in the application of it, he is a better man than a raft of executives old and new who stand very much in need of just the sort of practical advice in which this book abounds.

In his *Mansions of Philosophy,* Dr.

Will Durant suggests that some of his readers had better dispense with the opening chapters as being a bit too technical for the general run of laymen. The author of *Human Nature and Management* warns the reader not to become discouraged early in the book; but expects him to find his way through the first 10 chapters, dealing in a clear and illuminating manner with the intricacies of personality psychology. For his patience in reading these initial chapters, the layman will find a rich reward in the succeeding discussion of the practical applications which take the form of methods and procedures adjudged psychologically sound in the management of human beings.

Mr. Tead appears reassuringly anti-robot. He is at his best in dealing with the problems of desirable group action. His conception of the new discipline is convincing: "that orderly conduct of affairs by the members of an organization who adhere to its necessary regulations because they desire to coöperate harmoniously in forwarding the ends which the group has in view and willingly recognize that to do this their own wishes must be brought into reasonable unison with the requirements of the group in action." In the presence of such wholesome reasoning, our faith in the blessings of American democracy gets a substantial boost. Yes, we are doing better and we will do better still, no doubt, when we have our lesson from Mr. Tead and put his wise precepts into everyday practice.

MINOTT A. OSBORN

The Mind at Mischief (*Tricks and Deceptions of the Subconscious and How to Cope with Them*)—*By William S. Sadler, M.D., F.A.C.S. New York: Funk and Wagnalls,* 1929. 400 pp. Price, $4.00.

In the language of the street, this book is "just another one of those things." In the language of science, it constitutes just another portion of psychiatric hash—and not very good hash at that. The author has drawn upon a bewildering variety of sources for the description of the various conditions but he does so without any rational classification of the various concepts and points of view involved. The result is that the non-technical reader surely must feel confused at the mental gymnastics required of him, if he is to extract from this book any orderly, comprehensible idea of what it is all about.

As far as those parts of the book are concerned which represent Dr. Sadler's own thinking, there is little to recommend. His premises often are sketchy, his deductions frequently weird, and his thinking is shallow. *The Mind at Mischief* is just about the sort of effusion one has come to expect from enthusiastic and probably well-meaning authors whose training in psychiatry is negligible or, at best, meager.

In the exhaustive list of qualifications attributed to the author on the title page, there are none that would indicate he has had the privilege of receiving competent psychiatric instruction, and when one notes that the other books by the same Jack-of-all-trades author range from discussions of "Blood Pressure and Nerves" to "Constipation," "How to Feed the Baby," "The Elements of Pep," etc., one is perhaps justified in drawing conclusions as to his competency in any one of these fields.

"The Psychologist's Introduction" by Robert H. Gault, Ph.D., Professor of Psychology at Northwestern University, and "The Neurologist's Introduction" by Meyer Solomon, M.D., Associate in Neurology at Northwestern University Medical School, likewise contribute little to the usefulness of this volume.

In general, the reviewer feels that the book is of no particular importance.

GEORGE K. PRATT

HEALTH DEPARTMENT AND OTHER REPORTS

IRA V. HISCOCK

Cincinnati, O.—Municipal activities in this city for 1928 are recorded in a carefully prepared report of 198 pages, of which 8 are devoted to the Board of Health. A diphtheria prevention campaign was launched by the Health Department under the auspices of the Academy of Medicine, and over 25,000 children under 10 years of age went to their family physician or to a clinic for the toxin-antitoxin treatments. Next in importance was the summer round-up of preschool age children. This was the second year of an extensive program of preparing children under the age of 5 for their first year in school.

A health center houses a diagnostic chest clinic, primarily for the prevention of tuberculosis, a venereal disease clinic, an adult dental service, a heart clinic, a children's division, and the administrative offices of the Public Health Nursing Bureau. During the year a full-time medical service was developed.

A permit system inaugurated for all food establishments in 1926 is said to have resulted in marked improvement in shop sanitation. A total of 6,529 applications for permits were filed, at a service charge of $2.00 for each inspection. Seventeen permits were revoked from establishments which failed to maintain proper sanitary standards. Effective this year, it was also necessary for the milk collectors to obtain a permit from the Health Department in order to deliver milk for use in the city.

Coincident with the general pasteurization which became effective in 1915, there has been a marked decline in the number of cases of typhoid fever, diphtheria, tuberculosis, and other communicable diseases that are milk-borne. Paralleling this, we see a marked decrease in infant mortality, and especially in the deaths from gastroenteritis among children under the age of 2.

Each public health nurse carries out a generalized program in her district. By this means, " the family is the unit with which the nurse works rather than the individual who may present a special condition. This procedure results in an elasticity of service which insures health supervision for every member of the family." There were 41,868 home nursing visits made in 1928.

Knoxville, Tenn.—The 1928 report estimates the population of this city as 105,400, and records a general death rate of 14.09 (12.8 for whites and 20.7 for colored), the resident rate being 12.9. A birth rate of 22.8 and an infant mortality rate of 87 are also noted. The leading causes of death are pneumonia, heart disease, tuberculosis, nephritis and congenital and early infancy conditions.

Milk supervision is exercised in accordance with the Standard Milk Ordinance which was adopted in 1924 and has stimulated marked improvement in conditions. Some 506 dairies with 6,569 cows produced an average of 11,059 gallons of milk daily, or nearly 0.9 pint per capita. There were 1,364 dairy inspections. Approximately 51 per cent of the milk supply is pasteurized.

Progress is noted in generalized nursing service, a total of 75,829 home visits having been made last year. There were 10,778 new cases admitted and 10,502 cases discharged. Of the new cases, 1,439 were under 1 year of age and 1,178 were 1 to 6 years of age, while 1,254 were 6 to 16 years of age and 6,917 were over 16 years. Some 2,800 visits were made to 436 well baby conferences.

This mimeographed report of 89

pages abounds in statistical tables, charts, and graphs, which add materially to the interest and value of the annual record of accomplishment.

Rhode Island Tuberculosis Survey—A constructive survey of the tuberculosis work in 15 towns of the state has been made by the Superintendent of the State Sanatorium. These are towns in which tuberculosis clinics have been conducted by the medical staff of the sanatorium for periods varying from 2 to 7 years.

According to standards of the *Appraisal Form for City Health Work*, reporting averages only half of the standard of 2 cases (all forms) annually per death. One town receives full credit. The standard of 50 field nursing visits to homes of tuberculosis cases is reached by 7 of the 15 towns, while in 3 towns fully 20 per cent of the home visits were made to ex-sanatorium cases as is recommended.

The clinics in these towns are almost entirely diagnostic in nature, the patients being sent back to their physicians for treatment. In some of the towns hospitalization is high and unusually prompt. There were 1,190 individuals who made 1,543 clinic visits during the year.

Hospitalization at the State Sanatorium, Providence City Hospital, Hills' Grove Hospital and the Crawford Allen Hospital during 1928 amounted to 164,-101 hospital days against an Appraisal Form standard of 123,750. This figure is exclusive of preventorium. Newport has a summer camp for children and a pasteurized milk supply.

Seattle, Wash.—This city with an estimated population of 383,200 reports a birth rate of 13.03, a death rate of 10.4 and an infant mortality rate of 42 for the year 1928. Physicians in attendance at child welfare clinics for the purpose of making examinations and giving advice are selected children's specialists working under the management of the Seattle Pediatric Society in coöperation with the department of health. There were only 4 deaths from diphtheria with none from scarlet fever or smallpox during the year. The report recommends that necessary legislation be enacted to make compulsory the pasteurization of all of the city's milk supply with the exception of the certified product.

New York Tuberculosis Clinics—The 20th annual report of the Association of Tuberculosis Clinics, for 1928, shows that this voluntary organization includes in its membership 27 clinics functioning either under municipal or private auspices. Their activities are confined to clinic and home work among the tuberculous and the exposed families of these patients.

In 1927, 40 per cent of the patients came to clinics in the first stage of the disease, 42 per cent in the second stage, and 18 per cent in the third stage. In about two-thirds of the cases then there was already extensive involvement of one lung or disease of both lungs. Efforts are made to examine all members of households of tuberculosis patients and to maintain a continual check on the situation. These clinics are coöperating in a study of the effect of Calmette-Guérin vaccine on infants in actual contact with tuberculosis.

Winnipeg, Man.—The city assessor's figures show a population in 1928 of 202,377, while the annual report of the medical health officer indicates that there were 1,806 deaths in the year, or a rate of 8.9. An infant mortality rate of 63.46 is recorded. An influenza outbreak in December is said to have raised this rate from an average for 11 months of under 60. A birth rate of 22.1 is

only slightly lower than that for the previous year, while the marriage rate of 13.9 is higher (12.27 in 1927).

An excellent financial statement is presented in two parts, one covering the control and prevention of disease services, the other, refuse collection and disposal and street cleaning services. The net per capita expenditure under the first heading was 59.1 cents, being about one-third as large as that for the other items.

The outstanding event of the year from a health standpoint is said to be an outbreak of acute anterior poliomyelitis which occurred during the summer and early autumn. The report contains an interesting analysis of the outbreak with an account of measures carried out. The type, particularly in the early cases, was severe and the percentage of fatalities high. Of 225 city cases, 100 were among females. Ages varied from 2½ to 15 years. When a case was isolated in a home, children who resided on the premises were quarantined. Food handlers were quarantined unless arrangements were made for their change of address when the individual was prohibited from engaging in such occupation for a period of 2 weeks. Teachers, or persons having to do with children when exposed to a case, were quarantined for a similar period. Concurrent disinfection was recommended and at the termination of a case, thorough cleansing, sunning and airing of material in the sick room with soap and warm water were instituted. It is believed that the administration of serum early in the attack was of definite value.

Fort Worth, Tex.—The annual mimeographed report of the department of public health for the year ending September 30, 1929, shows that of the 2,929 births, 35 per cent occurred in hospitals. There were 1,941 deaths from all causes, of which 369 were among Negroes and 91 among Mexicans. Of these deaths, 134 occurred among infants under 1 month and 106 among infants of 1 month to 1 year of age. Communicable diseases are recorded according to the number of cases, the number of health department visits, the number of contacts, and the number hospitalized.

Twenty boarding homes were granted permits during the year and 906 children were placed in licensed boarding homes. A total of 1,162 birth certificates were delivered by nurses, while in 624 cases the homes could not be located for this purpose. Of the 9,501 persons who attended the health centers, 2,893 were infants and 3,495 were preschool children.

BOOKS RECEIVED

THE LAYMAN LOOKS AT DOCTORS. By S. W. and J. T. Pierce. New York: Harcourt, Brace, 1929. 251 pp. Price, $2.00.

A SYSTEM OF BACTERIOLOGY IN RELATION TO MEDICINE. By Various Authors. Vol. III. London: His Majesty's Stationery Office, 1929. 413 pp. Price, $6.00.

THE MIND AT MISCHIEF. By William S. Sadler. New York: Funk & Wagnalls, 1929. 400 pp. Price, $4.00.

THE MOST NEARLY PERFECT FOOD. By Samuel J. Crumbine and James A. Tobey. Baltimore: Williams & Wilkins, 1929. 292 pp. Price, $2.50.

BACKGROUNDS OF BIOLOGY. By John Giesen and Thomas L. Malumphy. Milwaukee: Bruce Pub. Co., 1929. 278 pp. Price, $2.50.

TULAREMIA—HISTORY, PATHOLOGY, DIAGNOSIS AND TREATMENT. By Walter M. Simpson. New York: Hoeber, 1929. 162 pp. Price, $5.00.

CHEMICAL ENGINEERING CATALOG. 14th ed. New York: Chemical Catalog Co., 1929. 1,205 pp.

HANDBOOK OF PHYSICAL EDUCATION. By Ernest G. Schroeder. New York: Doubleday, Doran, 1929. 323 pp. Price, $2.00.

NATURE STUDY—HEALTH EDUCATION SERIES. By Alice Jean Patterson. Normal, Ill.: McKnight, 1926, 1927, 1928 and 1929. Grades I and II, $.96; Grade III, $.80; Grade IV, $.80; Grade V, $.92; Grade VI, $.96. Science for the Junior High School, $1.60.

THE DOCTOR IN COURT. By Edward Huntington Williams. Baltimore: Williams & Wilkins, 1929. 289 pp. Price, $3.00.

HOOKWORM DISEASE. Its Distribution, Biology, Epidemiology, Pathology, Diagnosis, Treatment and Control. By Asa C. Chandler. New York: Macmillan, 1929. 494 pp. Price, $5.00.

PSYCHOLOGY AND INDUSTRIAL EFFICIENCY. By Harold E. Burtt. New York: Appleton, 1929. 395 pp. Price, $3.00.

THE RAT: A WORLD MENACE. By A. Moore Hogarth. London: John Bale, Sons & Danielsson, 1929. 112 pp. Price, $2.50.

THREE MINUTE MEDICINE. By Louis R. Effler. Boston: Badger, 1929. 453 pp. Price, $3.00.

DISEASES OF WOMEN: SYMPTOMS AND TREATMENT. By Franklin I. Shroyer. Boston: Badger, 1929. 103 pp. Price, $2.00.

PUBLIC RELATIONS OF THE COMMISSION FOR RELIEF IN BELGIUM. Documents. By George I. Gay. Stanford University: Stanford University Press, 1929. Two volumes, 606 and 539 pp. Price, $10.00.

APPLIED ELECTROCARDIOGRAPHY. By A. E. Parsonnet and A. S. Hyman. New York: Macmillan, 1929. 206 pp. Price, $4.00.

SUMMARIZED PROCEEDINGS OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE FOR THE PERIOD FROM JUNE, 1925, TO JUNE, 1929. Washington: American Association for the Advancement of Science, 1929. 1,006 pp.

LAWS CONCERNING BIRTH CONTROL IN THE UNITED STATES. New York: Committee on Federal Legislation for Birth Control, 1929. 39 pp. Price, 25c.

CHILD CARE AND TRAINING, rev. ed. By Marion L. Faegre and John E. Anderson. Minneapolis: University of Minnesota Press, 1929. 274 pp. Price, $2.00.

GEWINNUNG UND KONTROLLE DER TRINKMILCH. By Dr. H. H. Boysen. Hildesheim: Verlag der Molkerei-Zeitung, 1929, 77 pp.

THE ESSENTIALS OF HEALTHY LIVING. By J. Mace Andress and I. H. Goldberger. Newtonville: Jennings Pub. Co., 1928. 31 pp. Price, $.20.

PETTIBONE'S TEXTBOOK OF PHYSIOLOGICAL CHEMISTRY WITH EXPERIMENTS. 4th ed. By J. F. McClendon. St. Louis: Mosby, 1929. 368 pp. Price, $3.75.

THE BLOOD PICTURE AND ITS CLINICAL SIGNIFICANCE. (Including Tropical Diseases.) By Prof. Dr. Victor Schilling. 7th and 8th rev. ed. St. Louis: Mosby, 1929. 408 pp. Price, $10.00.

THE SCIENCE OF NUTRITION SIMPLIFIED. By D. D. Rosewarne. St. Louis: Mosby, 1929. 314 pp. Price, $3.50.

SCHISTOSOMIASIS AND MALARIA IN RELATION TO IRRIGATION. By J. F. C. Haslam. London: His Majesty's Stationery Office, 1929. 52 pp. Price, $.35.

PRACTICAL PLANNING FOR SCHOOL FOOD SERVICE. Prepared by The John Van Range Co., Cincinnati, O. Free.

PRACTICAL LESSONS ON HAIR HYGIENE; Especially designed for use in Schools. New York: Cereal Soaps Co., Inc., 1928. 14 pp. Price, $.10.

A SYSTEM OF CLASSIFICATION OF SUMMER CAMPS. By Joseph Felsen. Reprint from The Journal of the American Medical Association, May 25, 1929.

PHYSICAL MEASURES OF GROWTH AND NUTRITION. Monograph No. 2 of the School Health Research Series. By Raymond Franzen. New York: American Child Health Association, 1929. 138 pp. Price, Paper $1.00, Cloth $2.00.

BETWEEN TWO AND SIX. By Richard M. Smith. Boston: Life Conservation Service of the John Hancock Mutual Life Ins. Co., 1929. Free to Health Officers and Social Agencies.

OUR CITIES TO-DAY AND TO-MORROW. Planning and Zoning Progress. A Survey by T. K. Hubbard and H. V. Hubbard. Cambridge: Harvard University Press, 1929. 389 pp. Price, $5.00.

CREATIVE ACTIVITIES IN PHYSICAL EDUCATION. By Olive K. Horrigan. New York: Barnes, 1929. 147 pp. Price, $2.00.

PRACTICAL MASSAGE AND CORRECTIVE EXERCISES. 5th ed. By Hartvig Nissen. Philadelphia: Davis, 1929. 271 pp. Price, $2.50.

CLINICAL MEDICINE FOR NURSES. 3d ed. By Paul H. Ringer, M.D. Philadelphia: Davis, 1929. 330 pp. Price, $3.00.

MEDICAL LEADERS FROM HIPPOCRATES TO OSLER. By Samuel W. Lambert and George M. Goodwin. Indianapolis: Bobbs Merrill, 1929. 331 pp. Price, $5.00.

AN ADVENTURE WITH CHILDREN. By Mary H. Lewis. New York: Macmillan, 1929. 250 pp. Price, $1.75.

THE HYGIENE OF THE SCHOOL CHILD. Revised and enlarged edition. By Lewis M. Terman and John C. Almack. New York: Houghton Mifflin, 1929. 505 pp. Price, $2.50.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH. D.

A History of Malaria—The probability of continued freedom from malaria in the north is contrasted with the persistent danger of a recrudescence in the south. All the factors are closely related to the agricultural development of the country.

BARBER, M. A. The History of Malaria in the United States. Pub. Health Rep., 44, 43: 2575 (Oct. 25), 1929.

A County Health Survey—A house-to-house survey of an Ohio county to determine the extent of health protection and the health needs revealed some arresting conditions. More than 3 per cent of the people had had smallpox; 80 per cent of the school children had not been vaccinated; diphtheria immunization was negligible. The work accomplished is recounted.

BARNES, M. E. A County-Wide Sanitary and Health Survey. Pub. Health Rep., 44, 39: 2315 (Sept. 27), 1929.

Granite Dusts—By a series of studies it was determined that a velocity of 1,500 feet per minute in dust removal hoods would keep down the dustiness of the air breathed by the operative below 10 million particles per cu. ft. of air, the safe limit. This standard places no hardship upon the granite-cutting employer.

BLOOMFIELD, J. J. A Study of the Efficiency of Dust-Removal Systems in Granite-Cutting Plants. Pub. Health Rep., 44, 42: 2505 (Oct. 18), 1929.

Irradiated Foods—All health workers will want the truth about irradiated foods, some of which are so widely advertised. Undoubtedly they will be asked about them by curious people. The answer will be found in this article, a chapter from the authors' book which is about to be published.

BLUNT, K., and COWAN, R. Irradiated Foods and Irradiated Ergosterol. J. A. M. A., 93, 17: 1301 (Oct. 26), 1929.

Diet and Dental Caries—Since diets high in mineral and vitamin content have been found to arrest dental caries within 2 months, the authors suggest that active caries should be viewed as indicative of nutritional deficiencies.

BOYD, J. D., *et al.* Dietary Control of Dental Caries. Am. J. Dis. Child., 38, 4: 721 (Oct.), 1929.

Chautauqua Health Talks—How health talks were prepared and delivered in Chautauqua and some of the more tangible results. From this beginning great accomplishments are possible.

CALVER, H. N. Tent-Speaking for Health. Quarterly Bull. (Millbank Mem. Fund), 7, 4: 77 (Oct.), 1929.

Joint Tuberculosis Project—How the Providence nursing association and tuberculosis league joined to tackle the problem of providing an adequate tuberculosis nursing service is interestingly told. The A. P. H. A. *Appraisal Form* is used to check results.

CLARKE, F. C. Combining Against Tuberculosis. Pub. Health Nurse, 21, 10: 522 (Oct.), 1929.

Rural School Ventilation—The generally unsatisfactory condition of the heating systems of the rural schools that were studied is described. Absenteeism due to respiratory illnesses was twice as high as the rates in Syracuse and four times that in New York schools.

DUFFIELD, T. J. A Study of Rural School Ventilation. Pub. Health Rep., 44, 40: 2383 (Oct. 4), 1929.

Heart Disease—Heart disease is a disease of early life; 75 per cent of all cases develop in children under 10. Heart disease is third highest in causes of death among children. These are some of the statements in this non-technical discussion of heart disease as a public health problem.

CLARK, T. Heart Disease as a Public Health Problem. Pub. Health Rep., 44, 41: 2463 (Oct. 11), 1929.

Health Examinations—A department store president comes out strong for health examinations. He tells physicians to organize for efficient health service, but neglects to point out just how the patients are to be induced to pay for being kept well.

FILENE, E. A. Autocare versus Medical Care. J. A. M. A., 93, 16: 1247 (Oct. 19), 1929.

Adaptability of the Body—Notes on the physical examinations of the participants in one of the notorious transcontinental "bunion derbies" prove an interesting commentary on the amount of punishment the human body can absorb.

GORDON, B., and BAKER, J. C. Observations on the Apparent Adaptability of the Body to Infections, Unusual Hardships, Changing Environment and Prolonged Strenuous Exertion. Am. J. M. Sc., 178, 1: 1 (July), 1929.

Incomplete Reporting of Births—The possibility of correcting reported birth rates as the author has done for the city of Baltimore, suggests the need for adjusting all birth statistics for the years prior to complete birth registration. This proposal would make less startling many convincing graphs showing the remarkable savings in infant lives by this and that child health activity.

HEDRICH, A. W. Correction of Birth Rates for Incomplete Reporting. Am. J. Hyg., 10, 2: 435 (Sept.), 1929.

Computing Epidemic Cycles—Two methods of obtaining epidemic cycles are discussed, one based on the assumption that the seasonal component varies, the other that it is constant. The author's opinion that the simpler method is satisfactory will be good news to struggling tyro statisticians.

HARMON, C. E. A Comparison of Two Methods of Obtaining Epidemic Cycles. J. Prev. Med., 3, 5: 405 (Sept.), 1929.

Is Immunity Transmitted to Babies?—The author studies the incidence of reportable diseases by months throughout infancy; presents his findings; leaves the answer to the reader. A stimulating and brief paper.

KNOWLTON, M. Do Mothers Transmit Immunity to Their Children? J. Prev. Med., 3, 5: 385 (Sept.), 1929.

Tuberculosis Epidemiology—Available figures of tuberculosis mortality in comparable form are studied in this paper. Among the numerous conclusions is the interesting one that should the present trend be continued, the tuberculosis death rate should be 10 per 100,000 in 1970.

LEE, W. W. The Epidemiology of Tuberculosis, Past and Present. Am. Rev. Tuberc., 20, 3: 368 (Sept.), 1929.

Cancer Studies—Many interesting conclusions are afforded by a study of the nativity of cancer patients in Massachusetts. Among them are these: Foreign born have higher rates than natives in cancer of the buccal cavity and stomach; Irish and Italians show higher rates in Boston than in their own countries.

LOMBARD, H. L., and DOERING, C. R. Cancer Studies in Massachusetts. J. Prev. Med., 3, 5: 343 (Sept.), 1929.

Metal Poisoning—The possibilities of poisoning by the ingestion of small amounts of lead, arsenic, etc., are discussed in detail.

MYERS, C. N., and THRONE, B. Health Hazards from the Ingestion of Small Amounts of Metals. New York State J. Med., 29, 20: 1258 (Oct. 15), 1929.

British Dairy Supervision—A paper on the sanitation of milk production in which the word "pasteurization" did not appear would be a rarity in the United States. How cows shall be kept and inspected and how milk is to be handled are discussed at length; but there is no word about pasteurization.

RABAGLIATI, D. S. The Milk and Dairies Order, 1926. Pub. Health, 42, 12: 408 (Sept.), 1929.

Tropical Medicine—A bird's-eye view of the problems of tropical medicine and the world-wide organization built to meet them.

REED, A. C. Tropical Medicine. Sci. Monthly, p. 458 (Nov.), 1929.

Industrial Health—The first ten of a series of health practice pamphlets to be issued by the Industrial Health Division of the National Safety Council have been published. They deal with the following subjects: chromium, lead, physical examinations, health supervision, eye hazards, carbon monoxide, wounds, skin affections. Health workers who have industrial hygiene problems to meet will find this series invaluable.

SAPPINGTON, C. O. Health Practice Pamphlets 1–10. National Safety Council, Chicago, Ill.

Organisms in Malignant Tumors—Reporting the findings of many years of study of an organism recovered from malignant tumors, never found in benign growths. Although the presentation is highly technical and no conclusions are attempted, health workers will be interested, if only because they will gain anew a wholesome respect for the newer conceptions of bacteriology.

STEARN, E. W., *et al.* The Ontogeny of an Organism Isolated from Malignant Tumors. J. Bact., 18, 4: 227 (Oct.), 1929.

Reducing Diets—The rudiments of weight reduction through diet are briefly presented. Specimen diets are suggested and tables of vegetables given.

TERRY, A. H. The Reducing Diet. New York State J. Med., 29, 19: 1192 (Oct. 1), 1929.

Baby Clinic Practice—In this British clinic a room with an out-door sheltered court is set aside where mothers may bring their children during the nursing period. Here the attendants can discover errors in breast feeding technic. Seemingly a sensible suggestion for babies needing such observation.

WALLER, H. K. Avoiding Failures at Infant Clinics, Med. Off., 41, 24: 263 (June 15), 1929.

Living in the Tropics—Life in the tropics will become more comfortable and safe for the white man but acclimatization, in its full and literal sense, will remain impossible. This is the interesting conclusion of this treatise, worth reading by all who face the problem of fighting heat.

WARD, R. D. The Acclimatization of the White Race in the Tropics. New England J. Med., 201, 13: 617 (Sept. 26), 1929.

Maternity Nursing—Worth-while illustrations with their detailed captions add greatly to the very practical information contained in the article mostly about the care of new-born babies. It is a fine example of the value of good illustrations intelligently used. The pictures are from the author's excellent new book *Nurses Handbook of Obstetrics*.

ZABRISKIE, L. E. Maternity Nursing in Hospital and Home. Am. J. Nurs., 29, 10: 1157 (Oct.), 1929.

NEWS FROM THE FIELD

DEVELOPMENT OF SCHOOL HYGIENE

BUENOS Aires, Argentina, was the first city in South America to start school-hygiene work. This work was introduced in Buenos Aires in 1886. At present the school medical board employs a large number of physicians, several dental inspectors, a large staff of health visitors, and one psychiatrist.

There are various kinds of clinics for the teachers and school children, such as eye clinics, ear, nose, and throat clinics, dental clinics, x-ray clinics, clinics for tuberculous children, and clinics for backward children. The school authorities have also established summer colonies for underfed children; school lunches are also provided.

In Rio de Janeiro, Brazil, the school medical service is only a few years old. A large number of school physicians, dentists, and nurses are employed. The school nurses assist the doctors during the examinations of the children and visit the children at their homes. There is a movement for the establishment of clinics for the free treatment of school children.

In Chile, as a result of a reorganization in 1928, a school medical service has been established in several cities.

In Santiago the school medical service consists of physical examinations of the school children and of clinical treatments. The work is carried on by physicians, assistant physicians, and nurses. There are in Santiago clinics for the diseases of the eye, ear, nose and throat, and a psychological laboratory. At the end of 1928 the government entrusted the school medical service to the care of the Ministry of Hygiene and Social Welfare. This permits the extension of the work to every part of the country where a public health officer is located.

The school medical service of Uruguay seems to be limited to the capital, Montevideo. It was established in 1908, but it has been extensively developed only in the last decade. There is now a large number of school physicians and nurses. School clinics have been established for the treatment of diseases of the eye, ear, nose, and throat, skin, and lungs; there is also a nutrition clinic. Several open-air schools and vacation camps are maintained by the Government, and a school-lunch system is maintained by a private society.—*Boletin del Institute Internacional Americano de Proteccion a la Infancia*, July, 1929.

INTERNATIONAL CONGRESS OF AMERICAN UNIVERSITIES

TWENTY–ONE nations of the New World will be represented in Havana on February 15, 1930, when the First International Congress of American Universities convenes. Fifteen important educational points are to be discussed, and these questions are now in preparation.

The fundamental aim of the Congress is to introduce international subjects into curriculums for the purpose of creating confraternity in student circles.

Dr. Octavio Averhoff, dean of the University of Havana, announced that two of the prominent guests of the congress will be Dr. Ray Lyman Wilbur, Secretary of the Interior and President of Leland Stanford University; and Dr. Charles Mayo. Both of these men will receive the degree *honoris causis* of the University of Havana during their stay.

THE PRESCHOOL CHILD

AN interesting and attractive booklet for the mother of the child under 6 years of age has been written by Dr. Richard M. Smith, Assistant Professor of Child Hygiene at Harvard Medical School. The title of the booklet is *Between Two Years and Six.*

Advice is given to mothers about the care of the child's body in health and sickness, and the child's mind as well. Space is provided for recording the child's development from year to year for the benefit of the mother and the physician who may see the child from time to time. This booklet is offered free to health officers and social agencies by the Life Conservation Service of the John Hancock Mutual Life Insurance Company of Boston, Mass.

PHYSICIANS IN CONGRESS

WHEN the Seventy-first Congress of the United States convenes in December there will be 7 physicians in it. At the last Congress there were 8 and the Sixty-ninth Congress had only 6.

The newest physician congressman is Senator Henry D. Hatfield of West Virginia; the oldest in the point of service is Representative John W. Summers of Washington.

The other physicians in this Congress are: Dr. Royal S. Copeland and Dr. William I. Sirovich of New York, Dr. J. Howard Swick of Pennsylvania, Dr. Edward M. Irwin of Illinois and Dr. Frank P. Bohn of Michigan.

STUDY OF BIRTHS

TRIPLETS are born about once in every 10,000 births.

Twins occur about once in 98 births.

These facts are disclosed in a study of births in non-municipal hospitals of the United Hospital Fund of New York, made by the Fund in maternity hospitals of the group and the maternity services of its general hospitals last year. Thirteen hospitals reported a total of 19,473 babies born last year. During the year there were only 2 instances of triplets, and 201 of twins. There were no quadruplets.

NEW OFFICERS OF DELTA OMEGA

AT the annual meeting of Delta Omega, the honorary public health society, held in Minneapolis on October 2, 1929, during the convention of the American Public Health Association, C. C. Young, Ph.D., D.P.H., Director of the Bureau of Laboratories of the Michigan State Department of Health, was elected national president. John A. Ferrell, M.D., Dr.P.H., of the Rockefeller Foundation of New York, was elected national vice-president, and James A. Tobey, Dr.P.H., of New York, was reëlected national secretary-treasurer.

SIGHT TEST FOR SAILORS

THE U. S. Public Health Service, for over 50 years, has conducted examinations and reëxaminations of masters, mates and pilots of American vessels, to determine visual and color perceptions. This has been done at the request of the U. S. Steamboat Inspection Service.

Lately, however, a more rigid test has been needed, and the commonly applied test with yarns and lanterns seems inadequate. After an intensive study, the Surgeon General of the U. S. Public Health Service has decided to introduce a " foolproof " method of testing vision, by using the colored plates test of the kind of which the Stilling's method is representative. This test has been adopted by the U. S. Navy and enables the medical officers to determine easily and with much precision whether an applicant has defective color sense, because, if so, the candidate is totally unable to perceive the figures that appear

upon the dotted chromatic plates. These are easily discernible to a person of normal color vision.

To prevent injustice to licensed pilots, masters and mates, the old test will be used when they are reëxamined.

UNIVERSITY COURSE IN ACCIDENT PREVENTION

AT the 18th Annual Safety Congress held in Chicago, September 30 to October 4, it was revealed that 97,000 persons were killed by accident in the United States during the last year—the greatest total of such casualties in the history of the country. At the same time the records of the New York State Department of Labor show that during the first 7 months of 1929 in the metropolitan district alone 10,000 more accidents were reported than during the corresponding period of 1928. This is characteristic of the situation in industry and in public life throughout the country. It is the belief of close students of this problem that the major cause of the present situation is the lack of leaders in this new profession. New York University has therefore decided this year to make its course for the training of public and industrial safety directors available to any interested man or woman showing qualities of leadership, irrespective of previous academic education. Ten free scholarships will be given.

The course will be given evenings at the Washington Square Branch of the University, and will be conducted in cooperation with the Museum of Safety and ten industrial and commercial associations which have been asked to designate scholarship students.

Students will be taken through the plants of members of the Museum of Safety and the various industrial associations where they may observe the technic of accident prevention.

BIOLOGICAL SUPPLY COMPANIES MERGE

PHYSICIANS and health officers will be interested in the merger of the H. K. Mulford Company and Sharp and Dohme, Inc. The latter has acquired all of the assets of the Mulford Company. An interest in Sharp and Dohme has been acquired by Alex. Brown and Sons associated with Chas. D. Barney and Company and Brown Brothers and Company.

The consolidation and merger craze has reached even biologicals and medical supplies. Physicians and health officers are interested in the stability and character of firms manufacturing and distributing such materials.

PERSONALS

DR. THOMAS J. SASSER has been appointed school physician in the Health Department of Charlotte, N. C.

DR. WALTER R. BERRYHILL of Belmont, N. C., has accepted an appointment on the faculty of the School of Medicine of the University of North Carolina.

DR. JULIUS F. MAUERMANN has been appointed health officer of Monroe, Wis.

DR. NELSON C. DYSART has been appointed as City Health Commissioner of Columbus, O. Dr. Dysart succeeds Dr. James A. Beer, who resigned.

ROBERT B. WATSON is the new Industrial Secretary of the Chicago Tuberculosis Institute, Chicago, Ill.

LEVERETT D. BRISTOL, M.D., Fellow of the A. P. H. A., who for the past year has been making a Health Survey of

the Bell Telephone System in the United States and Canada, has been appointed Health Director of the American Telephone and Telegraph Company with headquarters in New York City. For the last 6 years Dr. Bristol has been Director of Health Demonstrations for the Milbank Foundation, previous to which he had been Commissioner of Health of the State of Maine, and Professor of Public Health at the University of Minnesota.

MRS. ANNA L. BEESON, Financial Secretary of the American Foundation for the Blind, died recently on the Steamship Kungsholm, while on her way back to New York from Stockholm, Sweden. Mrs. Beeson was for many years associated with Helen Keller.

DR. CHARLES DEXTER LUFKIN of St. Paul, Minn., is the new assistant superintendent of the Kula Sanatorium on the island of Maui, Hawaii.

DR. HENRY L. DAVIS of Rockford, Ill., was elected surgeon general of the United Spanish-American War Veterans at their national convention in Denver.

CONFERENCES

Dec. 3–5, 7th Texas Sanitary Short School, Edinburg, Tex.

Dec. 6–7, New Jersey Public Health and Sanitary Association, Asbury Park, N. J.

Dec. 25–Jan. 1, Society of American Bacteriologists, Ames, Ia.

Jan. 17–18, American Social Hygiene Association, New York, N. Y.

Jan. 27–30, 12th Texas Water Works Short School, Abilene, Tex.

Jan. 27–31, Heating and Ventilating Exposition, Philadelphia, Pa.

FOREIGN

May 19–21, 1930, Second International Malaria Congress, Algiers, Algeria.

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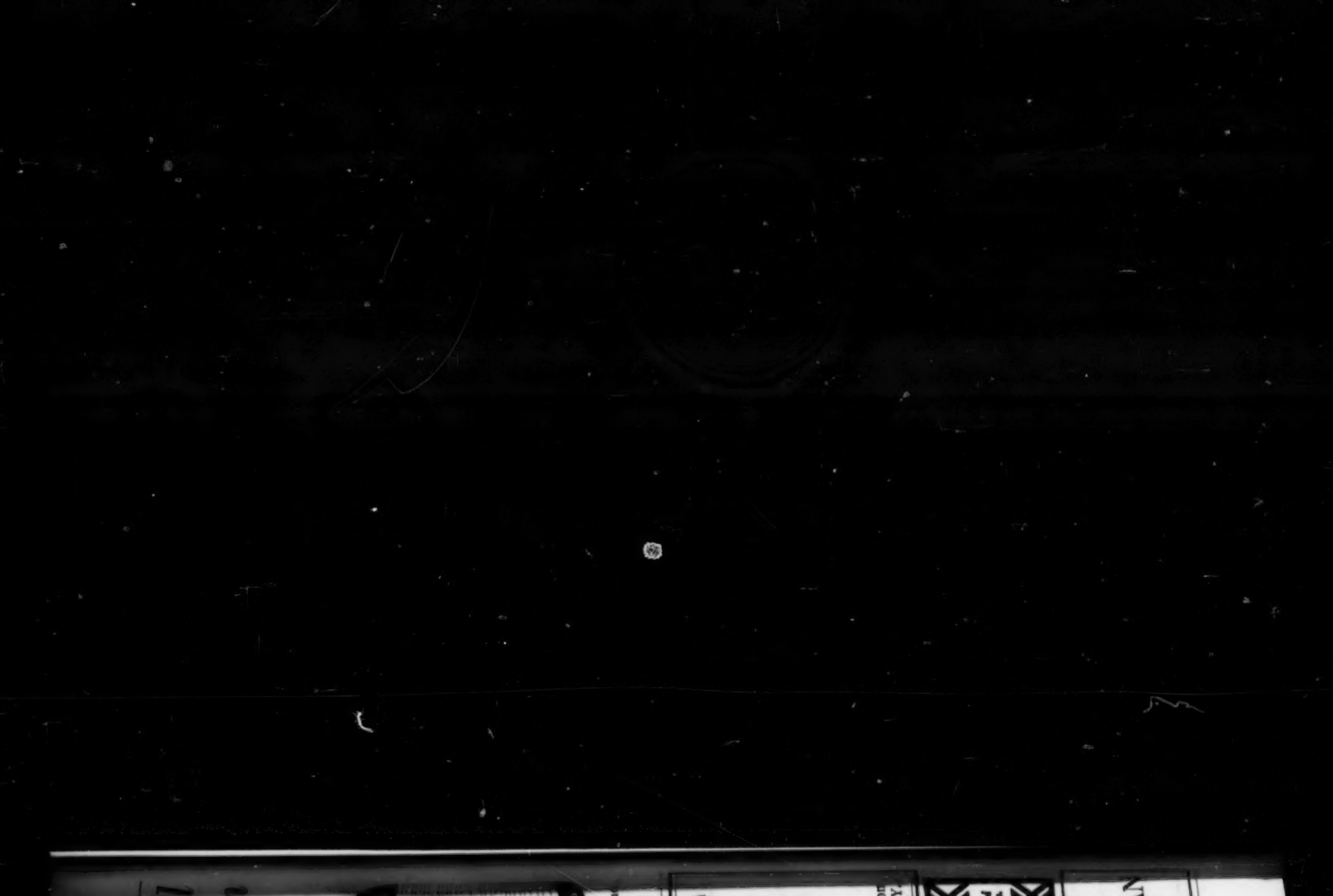
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